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Vol. 155, No. 11 March 15, 1945

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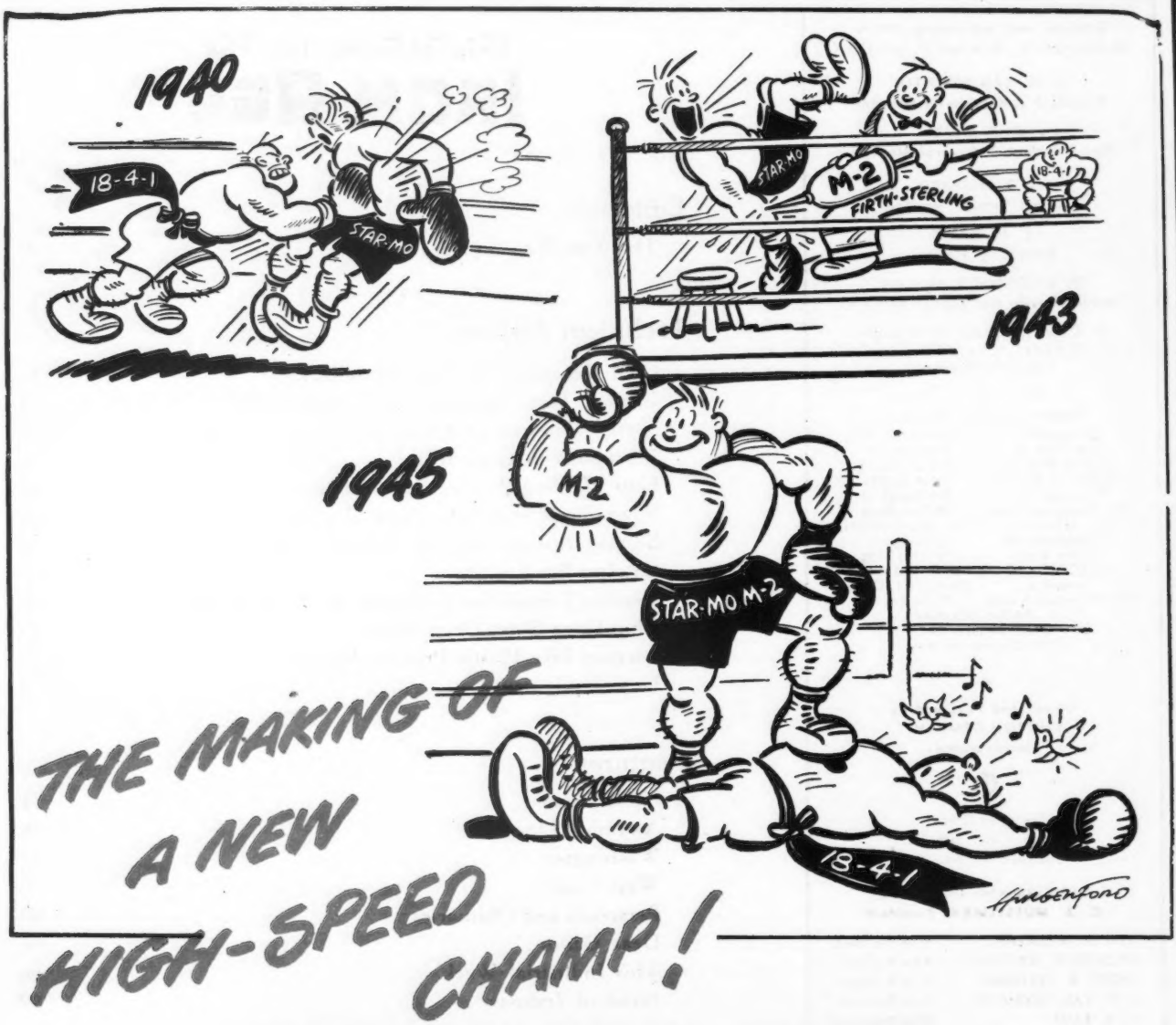


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The
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March 15, 1945

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# The Two-Way Squeeze

COLUMBUS discovered America and thereby made a name for himself. But some 453 years later, a fellow countryman of his discovered the two-way squeeze. Petrillo did it. Compared with him Columbus was a piker when it came to discoveries.

Columbus and those who followed him had a comparatively easy job in taking over America in the name of Queen Isabella. There was no opposition to speak of. The Indians were a peaceable and unsuspecting people. In welcoming the first few boatloads of white men to their shores, they could not foresee the hordes that would follow and soon drive them into virtual slavery.

Petrillo's job was not as simple. In taking over America in the name of the musicians' union and the A. F. L., he was up against a country with 130 million inhabitants, a strong federal government, a tremendous army and a ruler vociferously consecrated to freedom. Yet Petrillo took them over in scarcely more time than it took Columbus to cross the Atlantic.

If the Indians had known what and who were to follow Columbus, they would have booted him back to sunny Italy. And if Americans had realized who and what would follow Petrillo's coup in introducing the two-way squeeze, they would have done well to do likewise.

The two-way squeeze is a simple way to double one's income. You simply charge the customers both coming and going, while ostensibly not raising the fare. Mayor LaGuardia might take note of this and solve the financial problem of the New York subways very simply. All he would have to do would be to fix the turnstiles so that one would pay a nickel to get off as well as one to get on.

Petrillo visioned a source of revenue beyond that obtained from the suckers who paid him for the right to work, which in this case was the right to play. So with majestic power above that of government or people, he imposed a tax on the product. A royalty of so much per unit produced to be paid not to government, as taxes are supposed to be, but into the swollen coffers of a labor czar. Perhaps it would be more accurate to say a labor fuehrer.

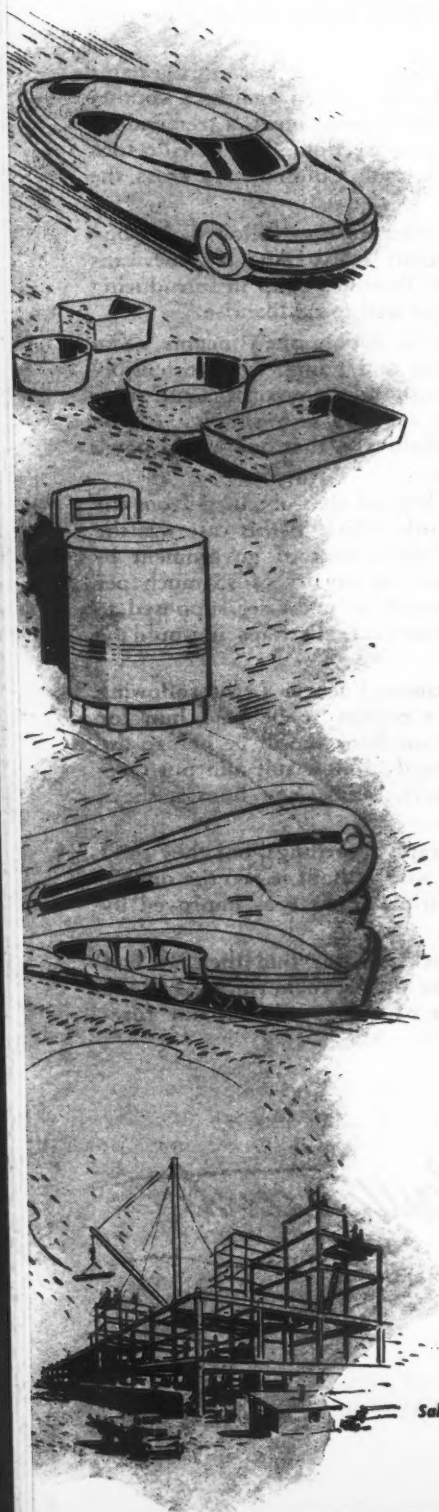
A smart idea takes hold fast. Now comes Fuehrer Lewis following Petrillo's footsteps with a demand for a royalty to be paid him for every ton of coal mined. How long do you think it will be before the other variegated fuehrers of the labor empire follow suit and put their personal taxes on automobiles, refrigerators, radios, new houses, shoes and bread?

People *can* get along without phonograph recordings, but they can't get along without coal. Nor can a war be won without it. So the double squeeze invented by Petrillo becomes a triple squeeze as improved by Lewis.

If Congress does not nip this new racket in the bud then we had better give this country back to the Indians and let them run it. For the new owners and rulers otherwise will be of the breed that our forefathers came here to escape.

# *Design —*

# For Safety and Dependability With Inland Steel



The buying public has learned to associate steel with safety and dependability. People ride in steel trains over steel rails, live and work in structures made strong with steel, travel the highways in steel automobiles, cross streams on bridges of steel, farm and manufacture with steel equipment, use steel furniture and innumerable household appliances—all with the knowledge that these things, made of steel, cost less, are more durable—have greater strength and safety.

Steel affords strength without excessive volume and weight. It is strong in tension as well as in compression. It quickly recovers from strain, and is resilient under shock. Steel reduces fire hazard to the minimum, and is practically unaffected by climatic conditions. Steel normally resists corrosion and can easily be more fully protected against such action. Steel absorbs neither moisture nor odors.

Inland has been a leader in the development of steels to meet changing industrial requirements—has continuously cooperated with industry to make available various physical properties and surface textures that give steel its unsurpassed flexibility in product design and fabrication.

The Inland laboratories and the Inland staff of engineers and metallurgists are at your service to help you meet the design problems of today and of the post-war period. We will be glad to help you on any design, material selection or fabricating problems.

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The IRON AGE
March 13, 1945

# NEWS FRONT

► Confusion in this country between officials as to the production of a new tank bearing a 90 mm. gun is matched by photographs from Germany of a new self-propelled 380 mm. mortar or howitzer mounted on a Royal Tiger chassis, now in use.

► A successor to the P-59A jet plane is expected in Buffalo, where Bell Aircraft built the first jet planes in this country. The early experience gained in experimental cooperation with engine research men would point the way for a new craft eliminating the engine obsolescence which has made the P-59A a trainer.

► "Frangible" bullets are now being used by the Army to train bomber gunners in firing at fighters. Use of a projectile made of colloidal lead and a thermosetting resin plastic, plus special armor for the pilot makes actual plane-to-plane firing possible.

A modification of Bell's P-63 Kingcobra is used for the target craft with a ton of 75ST up to 0.250 gage added to its skin. A hits indicating system operates a counter, and a light in the nose of the target plane to indicate accuracy to the gunner.

The projectile fired from a modified .30 cal. gun disintegrates on contact with the skin of the plane, although if firing were conducted with craft flying in opposite directions, the added velocities would make the "frangible" bullet a lethal weapon.

► Use of cold treatment for the stabilization of precision gears has considerably accelerated production. Before inauguration of the cold treatment process, six years were required to age AA gages (0.000002 in. accuracy). Shipment could not be made until one year later because of Bureau of Standards checking requirements, and bureau certification was not given for still another year.

After cooling in the tempering furnace to room temperature, the gage blocks are placed in an industrial refrigerator at -120 deg. F., and cooling takes place in atmosphere rather than in a liquid medium in order to avoid possibility of thermal shock. The complete cold treatment consists of six cooling cycles, each followed by tempering.

Heat treatment and quench achieves a microstructure which is approximately 93 per cent martensite. Each cooling-tempering cycle thereafter achieves transformation of an additional 1.5 per cent. The sixth cooling is a margin of safety.

► Additions of inoculants to gray iron reduce chill and promote machinability while keeping high strength and toughness.

Two kinds of inoculants are in use: graphitizers that reduce the chill, remove the undesirable structure of fine graphite and ferrite in a dendritic pattern and insure the machinability in light sections, and stabilizers which not only reduce chill but promote increased strength and hardness in heavy sections, thus improving uniformity throughout the casting.

► WPB'S new CMP Bulletin No. 57 raps the claimant agency practice of not ordering sufficiently far in advance for normal processing lead times. The bulletin intends to drive home the fact that directives are intended to remedy immediate emergencies and not to be used as super-priorities, or to anchor advance orders into schedules.

To get a directive now, claimant agencies must show the specific end product which could not be produced without receiving the specified quantity of material in the month requested; the date at which production of the end product would actually be interrupted by failure to receive requested delivery; inventory on hand; that the consumer and sponsoring service officer have been unable to locate a source of supply, and the date at which the order for the material was placed and the delivery time promised.

► Approximately 1000 plants of the automotive industry have produced $24 billion worth of military requirements, and cumulative war orders received by them since Sept. 1, 1939, have been more than $32 billion.

Production of aircraft and equipment last year accounted for 45 per cent of automotive industry's $9,361,000,000 output.

# Cold Treatment

# In Gage Stabilization

***. . . Six cooling cycles at —120 deg. F., each followed by tempering, completes austenite-martensite transformation to stabilize gage blocks. This treatment, along with the new Bureau of Standards test, has greatly accelerated production.***

o o o

By CHARLES T. POST

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QUALITIES sought in subjecting steel with austenitic tendencies to sub-zero temperatures as part of a heat treatment cycle vary considerably, ranging from increased hardness to improved magnetic properties. In each case, however, the result is sought by the same metallurgical change, transformation of retained austenite more completely to martensite. The physical properties achieved, hardness, magnetism, toughness or size stability, all are dependent on the extent and type of the martensitic structure achieved

Cold treatment, in itself, should be regarded only as a phase of the heat treatment cycle. Although metallurgists differ as to the exact extent, it is generally agreed that the results achieved depend heavily on the collateral heat treatment and quench. Metallurgically, though not commercially, cold treatment is the whipped cream on top of the peaches, for its province is those cases in which desired physical properties require greater than an approximate 90 per cent martensitic structure. In the vast majority of cases, a less refined product will suffice, and martensitic transformation up to that point readily can be achieved by heat treatment and quenching alone.

Possibly the commercial operation requiring the most complete martensitic transformation is the stabilization of precision gages. In this field cold treatment received one of its earliest applications, and extensive use has been made of temperatures below —100 deg. F. John A. Harrington, chief engineer of Continental Machines, Inc., and its subsidiary, Savage Tool Co., Savage, Minn., has particularly broad experience in large scale treatment of gages with accuracies as great as 0.000002 in. From a metallurgical standpoint, some of the phenomena observed in connection with the treatment and in corollary work are as interesting as the more prosaic treatment itself.

Gage steel employed is SAE 52100, although Harrington asserts that the general principles of the treatment employed apply similarly to steels of comparable austenitic tendencies. Before inauguration of cold treatment, six years was required to age AA gages (0.000002-in. accuracy). Shipment could not be made until one year later because of Bureau of Standards checking requirement, and bureau certification was not given for still another year. Change in bureau certification procedures, attesting stability will be subsequently described.

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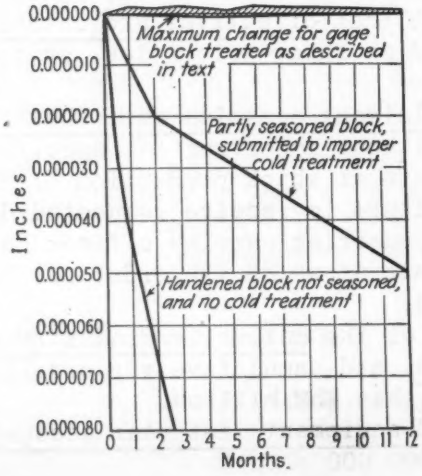
FIG. 1—Extent of stabilization of gage blocks is indicated by change in length per inch of 4-in. blocks which have been submitted to various treatments.




Emphasis given to the heating and quenching portion of the cycle springs from the necessity of attaining a high hardness range in the finished gages —from 65.5 to 67 Rockwell C—and the avoidance of non-uniform stresses. The latter not only constitute a threat of cracked material due to thermal shock in extreme cases, but also are a bogey to dimensional stability upon aging.

In the production cycle evolved by Harrington, the material is preheated to 600 deg. F., then heated to 1575 deg. F. Although it apparently is only necessary to hold the gage blocks to heat for a few seconds to attain uniform temperature, actual procedure calls for 4 min. as a safety factor. The succeeding quench is in oil at 85 deg. F. Great importance is laid on the method of introduction of the material into the bath, in order to secure uniform stresses. Before this factor's significance was determined, the blocks were placed in the bath in a haphazard manner. Subsequent Magnaflux examination showed that many were cracked, some severely, as a result of thermal shock. Moreover, difficulty was experienced in consistently securing a desired hardness approaching 67 Rockwell C. Harrington then devised a slide down on which the blocks were slid toward the oil in very much the same manner as a swimmer at an amusement pool. Momentum created on the incline gives the blocks a slight flip at the bottom of the slide, so that they enter the bath end first in a perpendicular plane, thus setting up uniform stresses. Originally agitated water was used as the quenching medium. Because desired hardness could be obtained with oil,

Fig. 2—Sine bar bodies are carefully placed in refrigerator.

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Fig. 3—Gage block blanks are placed in refrigerator.

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it was substituted in order to minimize corrosion.

The importance of uniform quenching poses a problem with regard to treatment of work having irregular section. A potential answer might be a jet quench, Harrington believes.

Immediately following the quench, the work is tempered for 1 hr. at 275 deg. F. This temperature, well within the stability range of martensite, relieves stresses without affecting hardness adversely in the first three draws of the six-draw hot-cold cycle, at least. After the fourth and fifth draws, hardness drops of 0.25 to 1 Rockwell C points are observed. Raising the draw temperature to 300 deg. F. produces a sharp drop in hardness after 1 hr., it is stated. A shorter, hotter draw will give the desired hardness but does not produce the tempered martensitic structure so important to dimensional stability.

Although some users of cold treatment contend that a lag of periods ranging from 0.5 to 8 hr. between quench, tempering, and the cold chamber does not affect transformation adversely, Harrington states that the cycle must be continuous to obtain maximum results. If the temperature curve is broken, transformation is immediately arrested, his experiments show.

After cooling in the tempering furnace to room temperature, the gage blocks are placed in a Deepfreeze industrial refrigerator of approximately 7 4/5 cu. ft. capacity and a negative temperature range to —120 deg. F. The cooling takes place in atmosphere rather than in a liquid medium in order to avoid possibility of thermal shock. Experience at Savage has shown that the transformation curve steepens at —25 deg. F. and thereafter maintains a constant climb until the temperature drops to —110 deg. F. Beyond that point, the rate of change slows, and negligible advantage is gained. The gage blocks are refrigerated to —120 deg. F., the additional cold serving as a factor of safety.

In each cooling cycle, the gage blocks are left in the refrigerator for 6 hr., representing the equivalent of 4 hr. at temperature. Following return to room temperature, the work is tempered as previously described. The complete cold treatment consists of six cooling cycles, each followed by tempering.

Heat treatment and quench, as described, achieves a microstructure which is approximately 93 per cent martensite, Harrington estimates. Each cooling-tempering cycle thereafter achieves transformation of an additional 1.5 per cent. Thus, after the fifth cooling, the transformation is considered to be complete. The sixth cooling is employed to provide a margin of safety.

The tempering following each cooling, of course, performs the same function as conventional tempering

following heat treatment, the relief of internal stresses. Because a martensitic structure occupies more space than the austenitic structure which it succeeds, internal stresses are set up as the transformation takes place, and the grain crystals grow. Tempering relieves these stresses, and, following complete transformation, eliminates subsequent shrinkage and insures dimensional stability.

Hardnesses achieved following the complete treatment range from 65.5 to 67 Rockwell C., with a cluster at 66.

Experimentation in connection with the treatment unearthed a phenomenon which Harrington reports without metallurgical comment. With the possibility in mind that the same degree of transformation obtained by six 6-hr. chillings could be attained by a single 36-hr. chilling at —120 deg. F., this treatment was tried, following the usual heat treatment and 275 deg. F. temper. One cycle of this duration achieved only partial added transformation, and a second and third 36-hr. cycle still failed to come up to the standard of the six 6-hr. periods with intervening temperings. A fourth 36-hr. chill did the trick, but this, of course, represented wasted time in comparison with the methods adopted.

Because the final steps in martensitic transformation are not readily detectable visually, even at 3000 diameters magnification, Harrington employs magnetic tests to determine the extent of change. This, of course, reflects the non-magnetic qualities of austenite, and the magnetism of martensite.

After the blocks have passed through the first chilling and subsequent draw, they are rough ground to remove any decarburization which might have taken place during heat treatment. This involves removal of about 0.001 in. from each side and brings them within 0.003 in. of final dimensions. After the complete cold treatment cycle they are finish ground, with 0.00025 in. taken off each side. They then are lapped, removing 0.00005 in. on each side.

After being completely finished, 10 per cent of each lot of blocks is subjected to a stability test developed by the Bureau of Standards. This test, according to Harrington, was authorized in June, 1943, to replace former methods which necessitated a delay of two years before stability could be certified. The new test comprises boiling for 24 hr. in a 0.5 to 1 per cent potassium dichromate aqueous solution (to prevent oxidation). Should the block change dimensions by more than 2 micro-in. per in. it is not considered stable. Some improperly stabilized blocks have been known to change as much as 175 microinches or more in a comparatively short time. Thus, to pass this test, absolute stability is essential.

An unintentional deviation in the use of this test at Savage recently led to observation of another metallurgical phenomenon. After the usual 24-hr. test, one set of blocks proved stable, with the usual Rockwell C hardness range of 65.5 to 67. However, they were inadvertently left in the boiling solution, which automatically replenishes itself in the vessel. The error was not discovered until one week later, when the Rockwell C had dropped to 32.

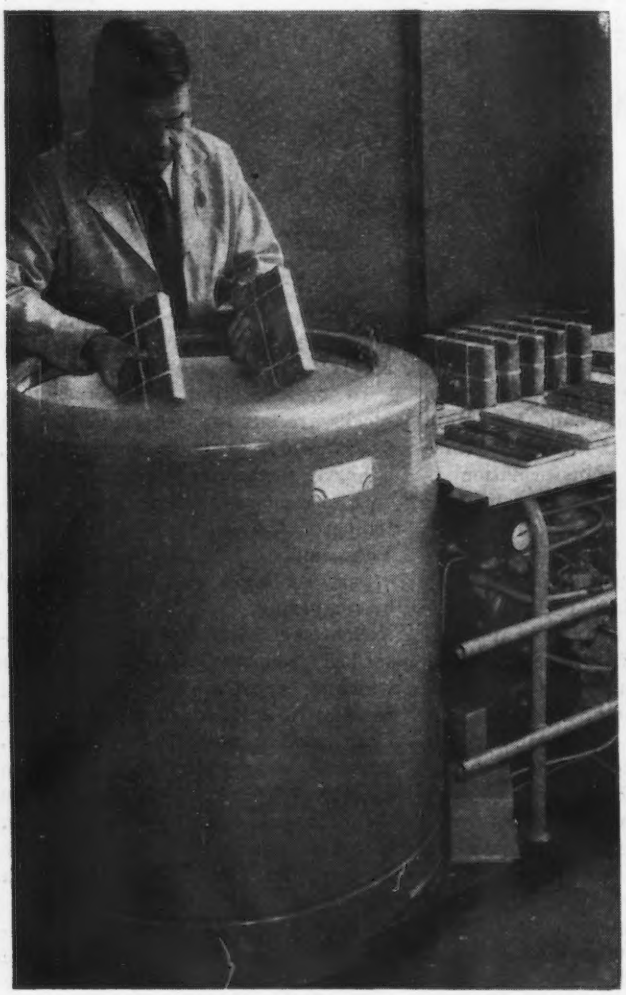

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FIG. 4—Master flats, which have been wrapped to prevent scarring in handling, are placed in refrigerator. Atmosphere, rather than a bath, is used to prevent thermal shock.

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BELOW

FIG. 5—Large gage block blanks are removed from the refrigerator.

# Further Tests Reported On Carbide Hobs

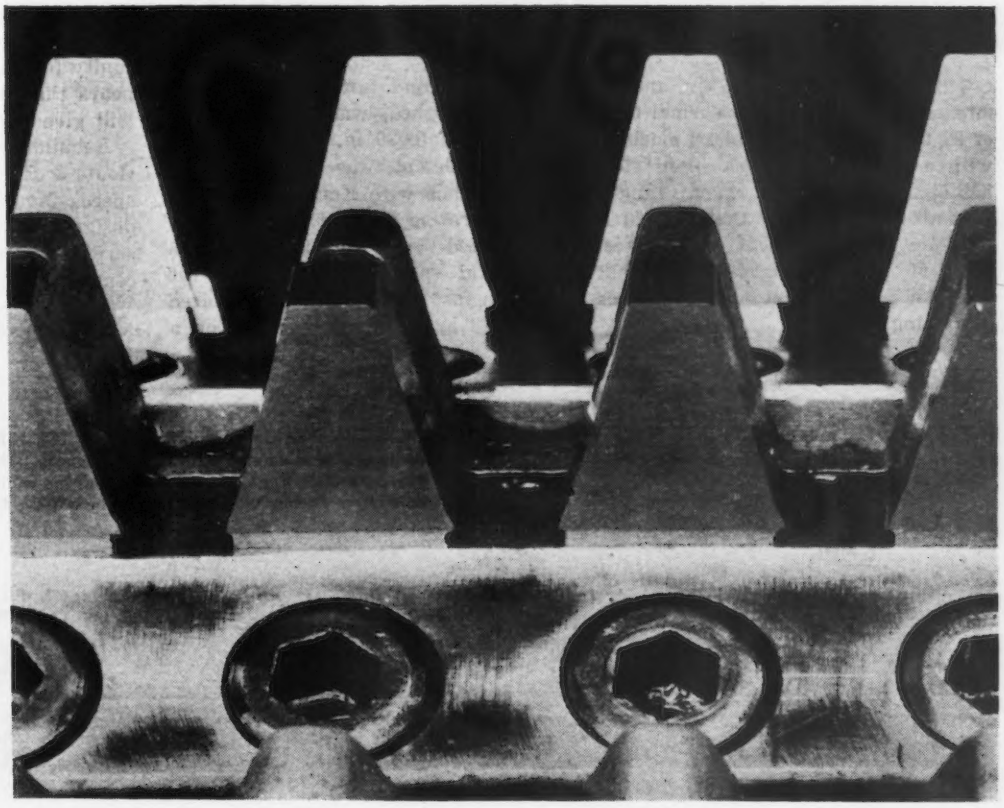
***. . . As a result of a new series of operational tests conducted at the Joshua Hendy Iron Works with a composite hob fitted with cemented carbide strip teeth, 80 per cent saving in the time of cutting big marine gears may be expected. Carbide tipped hobs may be operated safely at speeds up to 300 ft. per min.***

THE general principles of cutting with composite hobs at high speeds were satisfactorily established in July, 1944, at the Joshua Hendy Iron Works, Sunnyvale, Cal., when two specially constructed hobs with mechanically held strip teeth, one of high-speed steel, and one with Kennametal K-4H cemented carbide teeth were tested under the auspices of the Bureau of Ships, Navy Department. Results were satisfactory when a specially adjusted 72 in. Gould & Eberhardt hobber was run at 100 r.p.m., feed up, rotation down, climb hobbing. (See "Carbide Hob Tests Feature AGMA Meeting, THE IRON AGE, Nov. 9, 1944, p. 66.)

With the principle proved, study of the compiled data was continued in Washington while at the Hendy plant, the hobbing machine was rebuilt to enable more than double the speed previously possible, or approximately 224 r.p.m.

This time a tougher sintered carbide (Kennametal K-3-H) was used for the roughing cut, which was performed at 133 r.p.m. with a climb feed of 0.040 in. per rev. of the gear blank and a peripheral speed of 200 ft. per min. The hob was 6 in. in diameter, 5 pitch single thread, with a 2½ in. bore. Near the end of the cut, the hob was damaged, but not until the principles of design and operation had been satisfactorily proved. The experimental hob had not been held within normal operational tolerances, and was subjected to what amounted to a destructive test so that its capacities and operating range might be established. Failure of the hob revealed the necessity for certain changes in design and in the grade selection of the carbide cutting edges which would not have been discovered if the tool had not been pushed beyond its limits.

It was estimated, however, that a working tool held to proper tolerances would rough-cut a steel pinion for a



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MAGNIFIED section of composite hob, showing method of clamping strips to which sintered carbide tips have been brazed.

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TO give added support to the pinion blank, a steadyrest and an overarm support was applied to the 72 in. Gould & Eberhardt gear hobber, which was modified to give higher spindle speeds. Note the flywheel on the end of the hob spindle.

C-3 8500-hp. turbine in 5 hr. and 40 min., as compared to the normal time of 27 to 30 hr. on a standard machine with a conventional high speed steel hob operating at 35-40 r.p.m. Important also was the fact that the blank used for the experiment was of steel some 50 per cent harder than that used for pinions in standard methods of cutting.

In the second test, another blank, already roughed, was set up and a light cut of 0.030 in. depth, simulating a finish cut, was taken, using a left-hand hob with Kennametal K-4H teeth operating at 174 r.p.m., 0.090 in. climb feed and 261 ft. per min. peripheral speed. It completed the blank in just under 2 hr., as compared to the 23 hr. required normally on a standard machine. Tooth marks could be seen but not felt, and the helix angle checked within 0.0002 in.

Following this finish cut, a second C-3 pinion of approximately 284 Brinell hardness was set up, and the left-hand K-4H tipped hob was used to rough out one helix. Since this test was to determine the roughing qualities of the K-4H blades, it was decided to vary feeds and speeds to ascertain all operating characteristics.

A peripheral speed of 261 ft. per min. with 0.030 in. feed was used to cut the first 7 in. of the helix. The hob performed excellently and required the removal of only 0.005 in. from the face of the teeth to resharpen them.

Another 7 in. was cut with this K-4H tipped hob, using a speed of 336 ft. per min. and 0.030 in. feed, and this likewise cut very smoothly with no appreciable amount of dulling or chipping. It is interesting to note that although the machine had been set up for its top speed of 215 r.p.m., a tachometer reading showed that the spindle actually was turning over at 224 r.p.m., giving 336 ft. per min. surface speed.

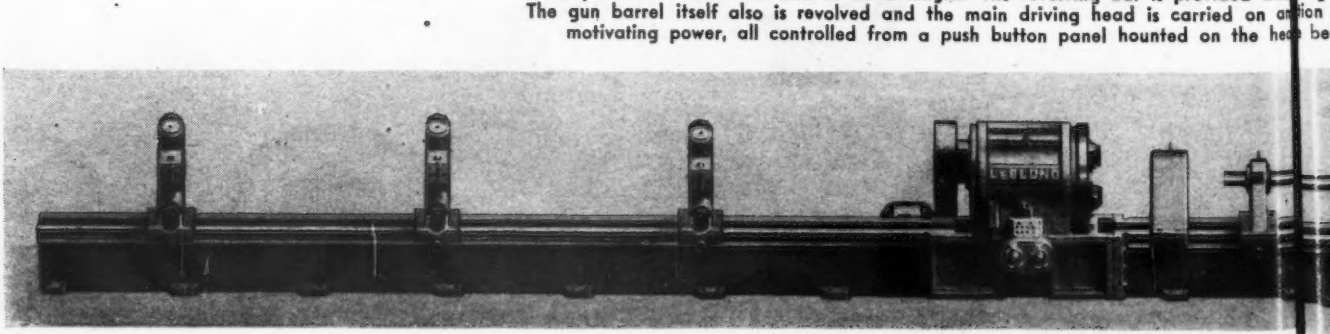
While not conclusive, these latter two runs would seem to indicate that higher speeds and lighter feeds will give the best cutting results. In this connection, the trend when using single-point carbide tools has been toward slower speeds and heavier feeds, primarily to stiffen up the chip and facilitate its breaking in short curls. Since the hobbing operation is a series of interrupted cuts with no opportunity for chips to "string out," it appears that high speed and light feed will give the best results.

Rebuilding of the 72 in. standard Gould & Eberhardt hobber for higher speeds involved no major changes in design and was accomplished without serious difficulties. The modifications consisted of the following:

1. Change of the gearing ratio at the swivel head from 8:1 ratio to 6:1 ratio,

▼ ▼ ▼

OVER 100 ft. long and weighing 60 tons, this LeBlond No. 7 gun boring lathe is [illegible] up to 27 in. diameter and 38 ft. in length. The revolving bar is provided with [illegible]ding. The gun barrel itself also is revolved and the main driving head is carried on a[illegible]ion motivating power, all controlled from a push button panel hounted on the hea[illegible] be



thus affording higher spindle speeds with a moderate speed at the long driving shafts.

2. The main spindle bearing was equipped with a bronze bushing in place of the original steel bushing. The intermediate and end arbor bearings were likewise equipped with bronze bushings.

3. All the bearings on the swivel head, swivel-head slide, and drive shafts (bearings normally equipped with grease cups), were supplied from a Bijur high-pressure oiling pump through a system of pipes and metering valves.

4. The hob-drive 90 deg. angle gear box on the lower end of the stanchion and the one on the swivel slide were connected with the oil pump at the main gear box to circulate oil for lubricating and cooling both bevel-gear boxes. After circulating through both small gear boxes, the oil returns to the main gear box.

5. To add rigidity to the set-up, the machine was equipped with a hob arbor 2½ in. in diameter. The machine was likewise equipped with an ovearm tying the work support column to the stanchion, thus giving the hobber added rigidity. This arm also carries a three-point steadyrest for the work.

6. A 10-in. diameter, 73-lb. flywheel was mounted at the free end of the hob arbor to add stability to the spindle in maintaining uniform angular velocity.

The consensus of those witnessing the experiments was that there would be a rapid utilization of the methods and techniques. They agreed generally that the principles established would result before very long in widespread benefits to the gear cutting industry at large, especially since it has been proved that hobbing machines may be operated successfully at speeds far above any ever attempted before and with no appreciable variation in accuracy or efficiency. It was revealed that contracts have already been let with the Illinois Tool Works, Chicago, for the construction of a number of the new composite hobs to be used in production.

Among the collateral results of the experiments was evidence that certain changes in coolants will bring about improvements in the performance of cutting tools. Modifications in the coolants used will be tested in future experiments.

Also of significance was the successful cutting of much harder steel in the blanks, as enabled by the carbide tools.

# Surface Film on 18-8 Stainless

TESTS made by W. H. J. Vernon, F. Wormwell and T. J. Nurse on the surface film on chromium-nickel (18-8) stainless steel for submission to the British Iron and Steel Institute, led the investigators to suggest that the enrichment of chromium as chromic oxide in the surface film and its dependence on the degree of polish are associated with surface flow during polishing. This serves to bring the metallic constituents into more intimate contact with available oxygen. It may be that the oxidation rate is controlled partly by the free energies of formation of the respective oxides and probably to a greater extent by selective oxidation arising from the restriction of oxygen at the surface between the metal and the polishing material while surface flow is taking place.

In conducting the study, several types of surface finish were used (abraded with emery and industrially polished) and the surface oxide film was then stripped from the 18-8 austenitic stainless steel. From the results of chemical analysis of the film, estimates were made of its thickness and composition in relation to the influence of polish and of the polishing material. The thickness of the film as measured by total oxides present ($Cr_2O_3$, $Fe_2O_3$, NiO) increases with the degree of polish. For all methods of preparation there is a marked enrichment of chromium in the film as compared with chromium in the underlying steel. This enrichment increases with the degree of polish. In the steel the ratio of chromium to iron (by weight) is 0.24; in the film it is approximately 0.7 for abraded surfaces, 3.8 for surfaces of moderate brightness and approaches 9.0 for the most brightly polished surfaces. The concentration of chromic oxide in the film correspondingly increases to a maximum and fairly uniform value of 90 per cent by weight, the remainder being mostly ferric oxide. No enrichment of nickel in the film as compared with that in the steel has been observed. In two cases the initial "metal ratio" was approximately just realized in the film, the concentration of nickel then being equivalent to the presence of about 2 per cent of NiO.

When the final polishing is carried out with alumina, this substance is introduced into the film to the extent (in the examples investigated) of approximately one-third of the total weight of oxides in the film. This has the effect of depressing the concentration of chromic oxide to a somewhat greater extent, the balance being made up by an increase in the content of ferric oxide. The use of chromic oxide in the final stages of polishing, although giving a very fine polish and a rather thicker film, does not increase the concentration of chromic oxide in the film beyond approximately 90 per cent, which is characteristic of highly polished surfaces.

Electrode potential measurements on specimens immersed in a 0.005 normal sodium chloride solution have confirmed that a surface from which the film has been removed is considerably less passive than the polished surface, although the difference diminishes with prolonged immersion. These measurements have also shown that specimens polished with chromic oxide are markedly more passive (more noble) than specimens polished with alumina.

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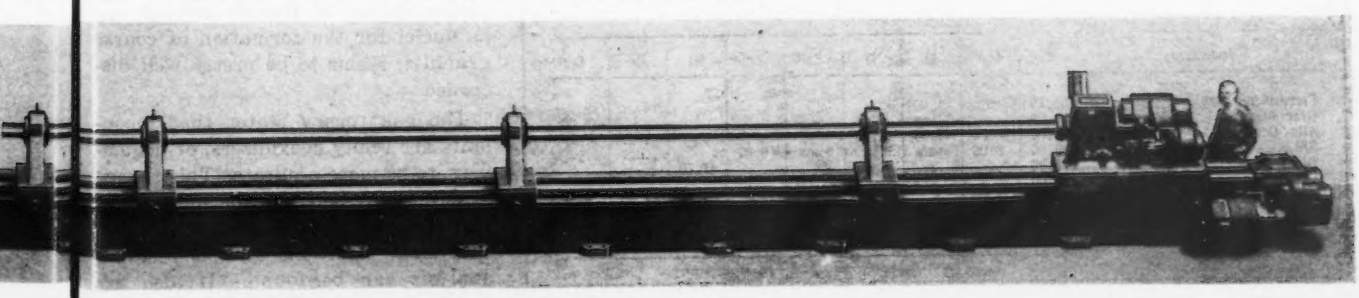
est to be built at the Cincinnati machine tool builder's plant. It machines gun tubes ▼ ▼ ▼
ing force of 50,000 lb. and its travel is governed by a 4 in. screw running in oil.
ion bearings 41 in. in diameter. Five electric motors, totaling 100 hp., provide the
bed is of sectional construction, allowing for increased length if necessary.



# Inoculants In Gray Iron

By REBECCA HALL SMITH
*Metallurgist, Northrop-Hendy Co. Hawthorne, Cal.*

***. . . In a general review of the subject, Mrs. Smith shows how the use of inoculants aids both large and small foundries in obtaining better castings, either by the control of graphite or as stabilizers and strengtheners. Tests are described which help in the selection of the type of inoculant and the amount to use.***

INOCULANTS are the latest step forward in the constant progress towards better, sounder castings of gray iron. Much has been written about the good engineering properties of modern gray iron, but to be significant to the designer and user, these properties must be available in the commercial castings. The finest test bar results do not have so much influence with users of castings as the reports from the machine shop as to whether the parts are machinable. One of the chief purposes of inoculating gray iron is to reduce chill and promote machinability, while keeping high strength and toughness.

Inoculants are also helpful in maintaining uniformity among different castings and between different parts of the same casting. It is no longer news that many foundries offer gray iron with minimum guaranteed tensile strength of 55,000, 65,000, and even 75,000 lb. per sq. in. Instead the emphasis today has shifted from increasing strength still further, to getting the same value every time. Naturally, the proper selection of analysis, correct cupola operation, sand control and alloy additions are necessary for super-duty gray iron castings; but inoculants also play a most important part. Inoculating additions help smooth out the variables which will occur occasionally in spite of close control and thus insure uniformly good iron.

The word "inoculant" has been used to mean everything from minute ladle additions of deoxidizers, to 1 or 2 per cent of alloys. Originally, it meant to nucleate the iron, by providing nuclei on which graphite formation could begin. In this article, inoculant refers to ladle additions made for the purpose of controlling graphitization. Ladle additions of alloys may or may not be inoculating in effect, and a distinction should be made between irons which are alloyed, those which are inoculated, those which contain both alloying and inoculating additions and those which have neither.

All ladle additions are made with the same broad aim in view: to make the iron coming from the furnace more suitable for the castings which are to be poured from it. Like alloys, inoculants must be chosen for the particular job at hand, always keeping in mind the properties of the base iron to which they are added. And, again like alloys, they may be used for several different reasons. Most often, inoculants are added to change the chill, usually to reduce it; but they are also frequently used to remove the objectionable fine-graphite-ferrite structure, and lately have come into favor as a standard addition for purposes of control. The use of calcium silicide in the ladle to cause graphitization in irons which would otherwise be white in fracture, is the well-known patented Meehanite process.

**TABLE**
Typical Composition of Common Inoculants, Per Cent

| Inoculants | Si | Mn | Al | Ti | Ca | Zr | Ni | Cr | C |
|---|---|---|---|---|---|---|---|---|---|
| Ferrosilicon, 85% | 86.10 | ..... | 1.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| Graphidox No. 1 | 25.00 | ..... | 14.49 | 7.00 | ..... | ..... | ..... | ..... | 2.00 |
| Alloy C | 70.00 | 10.00 | 1.64 | 1.00 | ..... | ..... | ..... | ..... | ..... |
| SMZ | 63.00 | 6.00 | some | ..... | some | 6.09 | ..... | ..... | ..... |
| Ni-Si | 50.30 | ..... | ..... | ..... | ..... | ..... | 47.70 | ..... | ..... |
| Ca-Si | 63.00 | ..... | ..... | ..... | 31.00 | ..... | ..... | ..... | ..... |
| CMSZ No. 4 | 20.00 | 5.00 | ..... | ..... | ..... | 1.50 | ..... | 47.00 | 3.75 |
| CMSZ No. 5 | 15.00 | 5.00 | ..... | ..... | ..... | 1.00 | ..... | 53.00 | 4.25 |
| V-5 | 15.00 | 10.00 | ..... | some | some | ..... | ..... | 40.00 | ..... |

## Theories of Inoculation

There are many theories to explain the whys and wherefores of inoculation. It is a definite fact that putting small amounts of certain materials in the ladle causes graphite to form in normal flakes, with random distribution, instead of in very small flakes in a dendritic arrangement. But no one knows exactly why this is true. Several theories explain most of the phenomena associated with inoculating irons, but no one idea is universally accepted.

Probably the graphite nuclei theory finds most widespread acceptance today. It holds that the particles in a ladle addition act as nuclei on which flake graphite starts forming. The old silicate slime theory, that submicroscopic slimes of ferrous silicate act as nuclei for the formation of coarse graphite, seems to be pretty well discarded.

The gas theory states that inoculants are really deoxidizers, or degasifiers, to be more accurate. This theory explains why some of the most effective inoculations can be made with such small additions that no residual analysis can be found. It also ex-

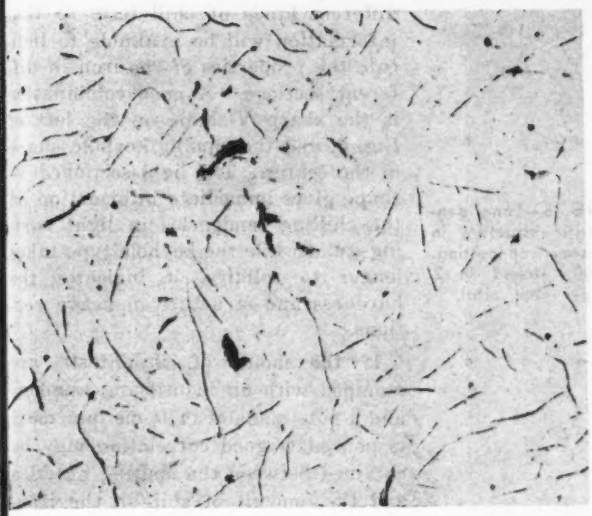


FIG. 1—Normal flake graphite in the bore of a gray iron motor block. Wear, 0.000664 in. per 10,000 miles. X100, unetched.

FIG. 2—Dendritic Type D graphite in the bore of a gray iron motor block. Wear, 0.003730 in. per 10,000 miles. X100, unetched.

plains why cupola melted and electric furnace melted irons react differently to inoculating additions. The fact that the beneficient inoculating effect is temporary, wearing off in 10 to 30 min. depending upon the type and amount added, is easily understood if one accepts the gas theory as correct. Furthermore, if inoculation is really degasification, then the extra effectiveness of alloy additions in inoculated irons is explained.

## Objectionable Graphite Structure

The undesirable structure of fine graphite and ferrite in a dendritic pattern is variously referred to as eutectiform structure, Type D graphite, and grain-boundary-type graphite. It appears to be closely related to the cooling rate and is more liable to occur in irons with low carbon-equivalent (total percentage of carbon plus 0.3 per cent silicon) than in high carbon, high silicon types. Experience has proved that this dendritic arrangement of fine graphite, by whatever name it goes, means poor wear, poor strength, poor service in the casting. Besides being weak, this structure often causes trouble in machining. It may be too soft and gum up the tools, or it may have hard spots. Because formation of this Type D graphite is favored by a rather critical cooling rate, it may appear just under the cast surface; after machining, the weak structure is on the wearing surface, with consequent trouble.

The evils of this dendritic graphite structure are not at all theoretical. Fig. 1 shows the structure of a cast iron motor block taken from the bore of No. 7 cylinder, about ½ in. from the top. This is conceded to be the position of greatest wear. The unetched structure shows normal flake graphite in random distribution and is typical of the general run of iron from this company. Wear loss per 10,000 miles of operation was 664 millionths of an inch.

In Fig. 2 is the structure of another block made by the same foundry, taken from the same place in the casting, with the same chemical analysis and Brinell hardness. A different cooling rate accounts for the great difference in structure. This dendritic fine graphite structure had a wear loss of 3730 millionths of an inch per 10,000 miles operation, or approxi-

FIG. 3—Structure of motor block castings subject to cracking. X100, unetched.

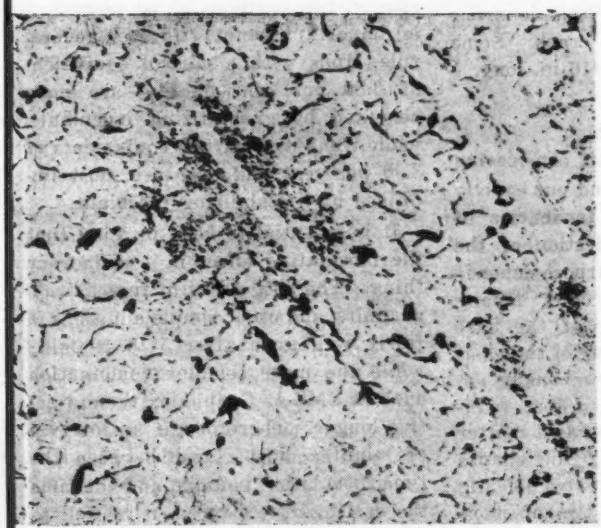
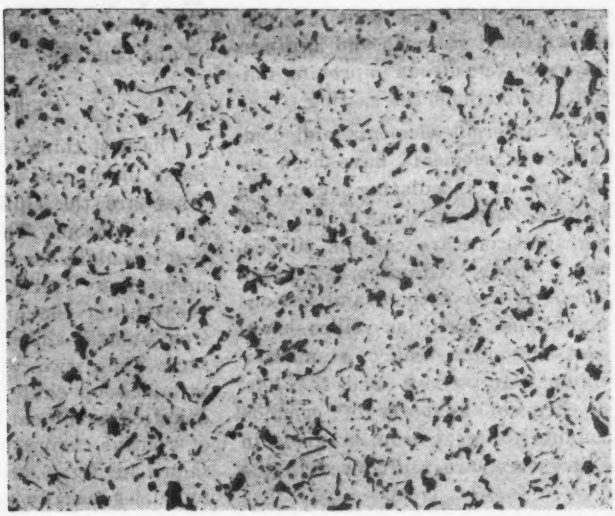


FIG. 4—Structure of sound gray iron motor block casting, showing random graphite distribution. X100, unetched.



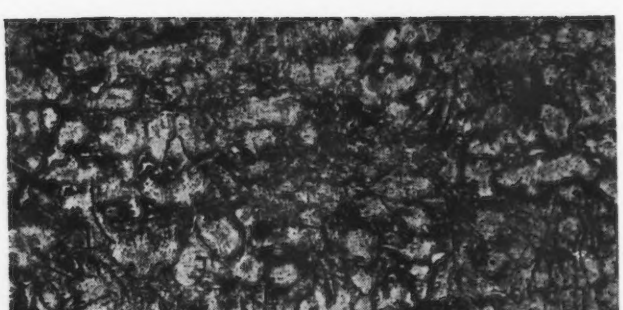


FIG. 5—Long dentritic structure in a gray iron casting. X100, etched in 2 per cent nital.

mately six times that of the iron with normal flake graphite.

It was an especially happy discovery that inoculants would remove this type of structure; the additions are simple and easy to make, and while of course there is danger in adding too much, still the inoculants, when added in the proper proportion, do not harm iron which would solidify in flake graphite with normal distribution anyway.

## Types of Inoculants

There are two kinds of inoculants, graphitizers and stabilizers. The graphitizers reduce the chill, remove Type D graphite structure, and ensure machinability in light sections. For irons with a low carbon equivalent, this is the right kind of inoculant. Irons with a high carbon equivalent need a stabilizing inoculant, because that has some carbide stabilizer such as chromium in addition to the graphitizers like calcium, silicon or zirconium. Such stabilizers reduce chill, but at the same time promote increased strength and hardness in heavy sections, thus improving uniformity throughout the casting.

Many different elements and combinations of elements have been investigated as inoculating agents in gray iron. Among those found good for graphitizers are calcium silicide, nickel, silicon, titanium, Mexican graphite, silicon carbide and various combinations such as silico-manganese-zirconium, silico-aluminum-titanium (Graphidox) and the like. The chemical analyses of common inoculants for gray iron, as given in the literature, are reproduced in the table.

Ferrosilicon is the most generally used. Where it is merely a question of reducing the chill, or of removing the objectionable dendritic graphite structure, it is usually adequate. By running the silicon a little lower through the cupola than desired in the final casting and then making a ladle addition of 0.25 or 0.50 per cent silicon, the foundry is assured of good normal graphite and improved properties. This is standard practice in many foundries.

Fig. 3 and 4 show the structure of two motor castings. Although no changes had been made in materials or operation, numbers of castings were cracking in the machine shop. Six cracked ones and six good ones were examined under the microscope, with the results indicated in Fig. 3 (cracked castings) and Fig. 4 (good ones). All the good castings had random graphite distribution. A ladle addition of 0.20 per cent silicon eliminated the dendritic structure and the cracks. By looking at Fig. 5, it is easy to understand why this dendritic structure was prone to crack. Some of the dendrites were 1/16 in. long.

## Chill Tests

The first thing to do, if considering using inoculants, is to find out exactly what are the chilling tendencies of the base iron. The selection of the best inoculant for the purpose depends upon many variables, chief among them being the quality of the base iron, and the chill desired in the casting. These two items are easily determined by chill tests. Most foundries today run chill tests as a matter of routine, using one of the shapes shown in Fig. 6. Progressive jobbing foundries usually make two or more different kinds of chill tests so that information will be available to indicate the properties of the iron in different sections. A good combination is the sharp V-shape on the left of Fig. 6, and the chunky keyhole shape in the center. The light-sectioned V-shape gives immediate information on the chilling tendencies in light castings, and while the keyhole type takes longer to solidify, it indicates the hardness and structure in heavy sections.

If the molds of chill tests are stamped with an identifying number, and a note made of the time that mold is poured, a good correlation may be obtained between the melting practice and the amount of chill in the iron. If the broken chill test specimens are stored in a rack which tells the date and time of pouring, they provide an accurate check on fluctuations throughout the day, and also check on castings poured from the same heat.

If the chill of the iron is already satisfactory, and inoculants are used mainly to get away from the dendritic graphite-ferrite structure, the wedge test shown in Fig. 7 offers a good method of checking results. These wedges are about 7 in. long, and taper from a 2 in. square at the top to a knife edge at the bottom. They thus have cooling rates corresponding to those occurring in all sections from zero to a 2 in. square. Since the Type D graphite structure is largely a product of the cooling rate, an examination of the polished wedge indicates where that undesirable structure is likely to occur in the castings.

The choice of which inoculant is best for a particular foundry depends upon the base iron to be inoculated, the castings to be made, and the melting and pouring practice in that special plant. Although naturally the size of the castings to be poured is an important factor, still as a general rule, irons with a carbon equivalent of 3.80 per cent or less are most benefited by graphitizing inoculants, while irons with carbon equivalents of 3.90 per cent and over are most improved by a stabilizing inoculant.

It is essential to keep in mind that the inoculating effect is a temporary thing. The good effect of ferrosilicon, graphite, and other simple additions is fairly well gone after 5 to 10 min., while the more complex combination such as SMZ or Graphidox remain active longer. Therefore, if an interval of minutes must elapse between the time inoculation is made and the time the castings are poured, it is well to

select an addition which will still be effective when the last casting is poured.

### Amount of Inoculant

After the chill of the base iron has been determined, the optimum chill desired has been decided upon and a tentative choice made of the inoculant to be used, the next matter for concern is the amount to add. While the manufacturers can offer helpful suggestions, they cannot lay down rules to be followed blindly, because the maximum benefit to be obtained depends upon many factors. The base iron, melting practice (iron which is slightly oxidized requires more inoculant for the same chill reduction), pouring temperature, the section of the castings and even the weather influence the percentage of addition needed. Some foundries have noticed that on damp muggy days, when there is a great deal of moisture in the air, more inoculant is required to do the same job than on clear bright days. Foundrymen usually try two or three different percentages, noting the chill reduction resulting from each addition, before standardizing on a certain definite percentage as best. Some plants make a practice of adding 0.20 per cent silicon, some 0.35 per cent, and when stabilizing inoculants are used, it is customary to add 0.50 to 1.50 per cent of alloy.

### Adding the Inoculant

Since inoculating additions are designed for that purpose, they are sold in the correct size and grade for ladle additions. However, if ordinary ferrosilicon is used, it is a good idea to specify 85 per cent ferrosilicon, as this grade is exothermic and therefore does not cool the iron. About pea size, say ⅛ x D, has proven very satisfactory. Mexican graphite also works best when added in pieces about that size. In fact, most inoculants seem more effective in the form of small particles than when powdered.

A good way to add the inoculant to the molten iron is at the cupola spout when the ladle is filled. This makes use of the turbulence of the iron to get complete solution and thorough mixing. For the sake of uniformity, some foundries add a weighed amount through a funnel at the spout. A considerable amount of activity in the molten metal is required to ensure immediate solution. It is important that the surface of the metal be clean, especially if graphite is used, as slag coats the graphite and prevents it dissolving. This is true for other additions also, as most inoculants are active deoxidizers and will reduce the slag instead of reacting with the iron, if there is slag present. Of course, if a forehearth is used, the additions are made as the iron leaves the receiver, instead of at the cupola spout.

FIG. 6—To determine the chilling tendencies of the base iron, two or more kinds of chill tests are usually run. The chunky keyhole cast gives an indication of the structure in heavy sections. American Foundrymen's Association.

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If the molds to be poured are so far from the cupola that some of the effect would be lost due to the passage of time, additions may be made directly to the ladle. The ladle must be hot and have enough metal to cover the bottom. Immediately after putting in the inoculant, the ladle is filled and the metal poured back and forth into another hot ladle to get perfect mixing. There is an optimum time to allow for the inoculants to attain full power, usually about 2 min.

Even after the inoculant is selected and the amount determined, adjustments may be necessary if there have been changes in practice. More graphitizer is needed if for any reason the base iron becomes harder, the pouring temperature is lowered or smaller sections are being poured.

It is a mistake to attempt to substitute the graphitizing inoculants for the proper amount of silicon in the mixture. Most of them are much stronger chill reducers than silicon, and they do not have exactly the same effect on other properties that silicon does. Used in the proper proportion and for the proper purpose, inoculants lead to better, more uniform castings; but used indiscriminately and improperly, they lead only to disappointment.

Next to chill reduction, the most useful quality of inoculants is their power to minimize the difference between the iron in light and heavy sections. Sensitivity to section size has always been one of the biggest problems to the gray iron foundryman, and it is a real aid in solving that problem to have an addition which at the same time reduces chill in light sections, and increases strength and hardness in heavy ones.

### Effect of Inoculants

Inoculants also increase strength and reduce deflection, the transverse strength being especially improved. The lower the carbon equivalent of the base iron, the more marked the improvement in mechanical properties resulting from inoculating additions. There are several reasons for this: First, the graphitizing inoculants are not in themselves strengtheners, but simply put the iron in the best condition to make use of its own potential strength. Second, the low-carbon equivalent irons are more prone to solidify in Type D graphite than higher carbon metals and therefore need an inoculant more than irons which might have random graphite distribution. Many low carbon irons show as much as 15,000 lb. per sq. in. increase in tensile strength. A rise from 45,000 lb. tensile to 60,000 lb. is common for correctly inoculated irons.

Because they reduce chill and promote uniform hardness throughout the casting, inoculants permit the use of

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FIG. 7—Wedge test specimens when polished give a good indication of the cooling rate in sections of varying cross-section. American Foundrymen's Association.

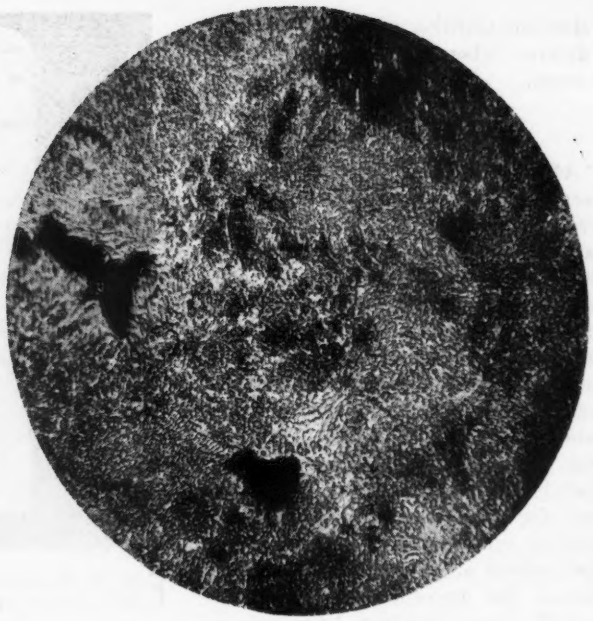

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FIG. 8—Typical example of "GA" Meehanite, an inoculated iron of 58,000 lb. per sq. in. tensile strength.

One of the large automotive foundries is meeting a difficult casting problem in the following manner: The castings, with sections from 5/16 to ¾ in., must have extra high strength, extremely good resistance to elevated temperatures and excellent machinability. An iron with 3.00 per cent carbon, 2.00 per cent silicon, 1.00 per cent nickel, 0.50 per cent molybdenum and 0.35 per cent chromium is melted in the electric furnace, but part of the silicon is obtained through a rather heavy inoculation with calcium silicide in the ladle. The foundry believes that this inoculation makes possible the minimum chill and perfect machinability of this casting. Brinell hardness is 248 to 269, and the as-cast test bars regularly exceed 55,000 lb. tensile strength.

The plant mentioned above is one of the largest, most modern and best equipped in the world. Another foundry which is known for producing extra high test gray iron is a very small shop, lacking a chemical or metallurgical laboratory, but rich in experienced and progressive personnel. This little foundry is also making 55,000 to 60,000 lb. tensile iron regularly, through the use of inoculants. Indeed, on one special casting, by the addition of 1.00 per cent nickel and 1.00 per cent molybdenum to an inoculated iron, it is guaranteeing strengths of 75,000 lb. per sq. in.

It has been said that for the fullest utilization of inoculants, close control of every operation, from melting through pouring, is essential. Certainly the foundry who has close control all along the line usually makes better iron; but the greatest benefit from inoculants comes from intelligent use. Probably inoculating additions are of more actual value to the small foundry with less accurate control, and therefore with more variables in composition and chill, because they promote uniformity.

Medium carbon-equivalent irons of around 35,000 lb. tensile strength may increase to 40,000 lb. or so after being inoculated. They show great improvement in strength and deflection, but not to such a marked degree as the low carbon irons. High carbon-equivalent irons, as mentioned before, get better results from the use of a stabilizing inoculant. Chill reduction is combined with higher strengths and denser structure in heavy sections.

Inoculants make possible using a high strength iron in sections which would formerly have been unmachinable. They also permit the utilization of lower-grade iron, as in the case of the British practice. By making late additions of silicon in the ladle, they meet specifications of 35,000 to 40,000 lb. tensile without difficulty, in spite of the high phosphorus (0.70 per cent) which is now necessary.

While the technique of inoculating gray iron will no doubt improve, and new balanced alloys will probably be introduced, the inoculants on the market now have already proved their value to the gray iron foundry.

Readers desiring more detailed information about the inoculants mentioned are referred to the following articles:

"Development and Control of Cast Iron," by R. A. Flinn and D. J. Reese, American Foundrymen's Association Transactions, Vol. 49, p. 559 (1941).

"Effect of Ladle Inoculation on the Solidification of Gray Cast Iron," by J. T. Eash. American Foundrymen's Association Transactions, Vol. 49, p. 887 (1941-42).

"Ladle Inoculation Improves Gray Iron Properties and Structure," by H. W. Lownie, Jr., The Foundry, Vol. 71, November and December 1943.

"Structure Control of Gray Cast Iron," by R. G. McElwee and T. E. Barlow, The Foundry, Vol. 72, February, March, April 1944.

"Alterations in Cast Iron Properties Accompanying Use of a Strong Inoculant of the Silicon-Manganese-Zirconium Type," by C. O. Burgess and R. W. Bishop, American Foundrymen's Association Transactions, Vol. 52, p. 671 (1944-45).

# Skip Welding Prevents Distortion

***. . . Some unusual procedures have been worked out in the fabrication of naval cartridge case chutes from high tensile formed steel plate and stainless steel bars.***

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*Louisville, Ky.*

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ONE of the vexatious problems encountered in the fabrication of a 6 in. cartridge case ejector chute, was that of distortion in welding. This chute is an accessory to 6-in. naval guns and is designed to carry off the empty shell cases from the gun breech. Because of the oscillating or sliding feature of this chute, there are rails, guards, lugs and ribs to be welded on and kept within very close tolerances for this type of apparatus.

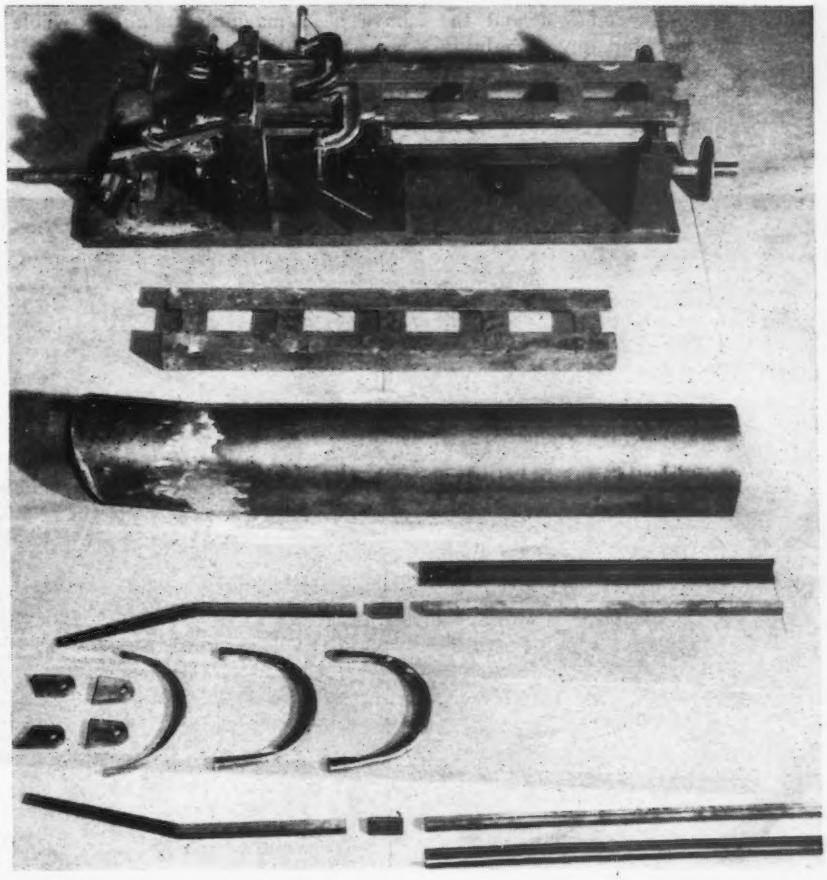
The chute itself is made of high tensile steel plate ¼ in. thick, to which are welded with stainless and mild steel rod, variously shaped pieces made from ¾ by 1 in. stainless steel bar stock. The chute is drawn to shape in a power press, after which it is assembled in a rigid fixture with all parts clamped in place with the exception of the guards which are attached as the second welding operation.

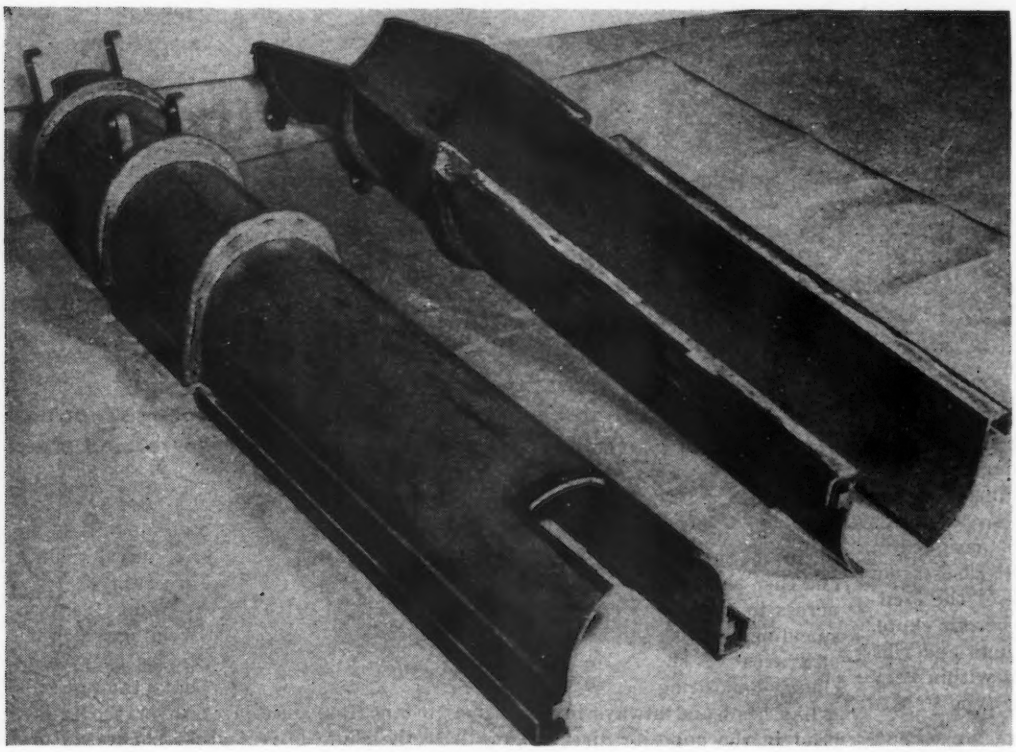
The stresses already set up in the chute by the initial drawing are further extended by the heat of welding. Those deformities which become evident in the chute bottom, or U-shaped plate, are comparatively easy to correct by virtue of that shape. But in welding one ¾ by 1 in. rail on each side of the chute well up toward the top of the U, the straight sides of which have a cross-sectional area approximately 40 per cent greater than the same sectional area of a rail, it is natural that most of the longitudinal distortion will be apparent in the weaker cross-section of the rails. If there is too much warping, the three sides of the rails might not wholly clean up to dimensions in the subsequent straddle milling operation. Also, warping induces spreading of the sides which may cause the rails to mill off too thin leaving insufficient stock to meet the specification for strength.

To minimize these conditions and to make the straightening less laborious and time consuming, a technique termed reverse skip welding is applied to the job. By welding about 5 in. in one locality and then skipping across to a correspondingly opposite area of the chute, depositing a like bead and always laying a new bead in the opposite direction of the old one in joining beads, it is possible to spread out the total heat more evenly and dissipate much of the effect of abnormal stresses occasioned by any welding process.

After the first welding which includes everything but the guards (the L-shaped pieces over the rails), the chute is removed from its fixture and sent to the heat treating oven with a temporary inside stiffener tackwelded in place. Set in a cool oven, the chute temperature is raised at the

SHOWING the components of a chute weldment and assembly fixture. From top, the loaded fixture with chute stiffener tackwelded in place; the stiffener, chute and accessories.





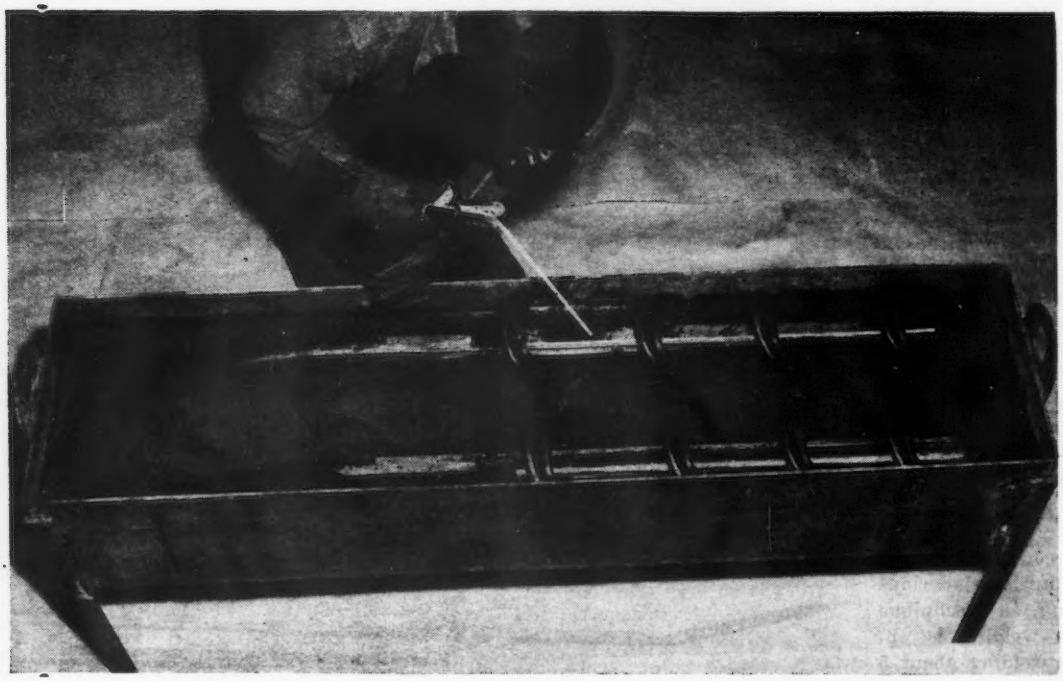
BOTTOM and top views of the finished weldment. The end views show why the guards must be attached after the slide rails are milled on three sides. Welding the guards in place while controlling distortion, is the critical operation.

rate of 150 deg. per hr. to a maximum of 1200 deg. F., at which it is held for approximately 1 hr. The oven is then allowed to cool naturally and is not opened for removing the normalized chute until after the oven temperature falls below 400 deg. This cycle is completed in about 24 hr.

The stiffener is removed and the chute is checked for any remaining distortion which is worked out by means of hammering and squeezing or spreading, as required. Sand blasting all over and milling of the rails follow in that order and the chute is ready for the second welding operation.

This is the critical stage of the assembly because another weld must be made to attach one guard over each rail (see end view) after the rails have been machined and the whole piece normalized. Any spread or widening of the finish width dimension is comparatively easy to correct; it is the "ocean wave" or up-and-down warping of the rails that must be eliminated, as the effect of such warping has proved itself almost impossible of removal due to the design of the chute.

After grinding the welding area the guards are clamped in place and the chute assembly is immersed in a tank filled with water sufficient to cover all of the chute except the welding area itself. This allows complete submersion of the finish machined rails which are thus kept free of



THE first welding operation completed, this view shows how contortion is minimized by immersing the chute in water for attaching the guards. Prior to this operation, the slide rails (under water) have been milled to a plus or minus 0.005 in. width tolerance which must be maintained or recovered by straightening. Note that the water surface is only about 1/4 in. below the electrode tip.

welding heat. The most suitable current and welding rods for these operations are as follows:

| Electrode size, in. | 5/32 | 3/16 |
|---|---|---|
| Mild steel, amp. | 180 | 205 |
| Stainless, amp. | 160 | 180 |

No laboratory or practical tests have been made to determine to what extent embrittlement of the weld has gone due to the rapid quenching effect of this method but the fact that there is very little distortion indicates that there is no undue strain or torsion set up in the area of these guard welds. The ocean waves in the rails, which gave so much trouble before the present method was used, have virtually disappeared in the underwater treatment. What little waviness remains after final straightening is well within tolerance and acceptable.

The same reverse skip technique is employed on the guard welds as on the rails. Some distortion occurs in the guards. There is a widening beginning at the top end of the rails, tapering to nearly normal at the midsection and narrowing at the bottom end of the rails. For all chutes, this range averages about 0.150 in. variation over the length of the welded area and is easily straightened due to the horseshoe contour of the chute.

# Power Feed Aids Contour Shaping

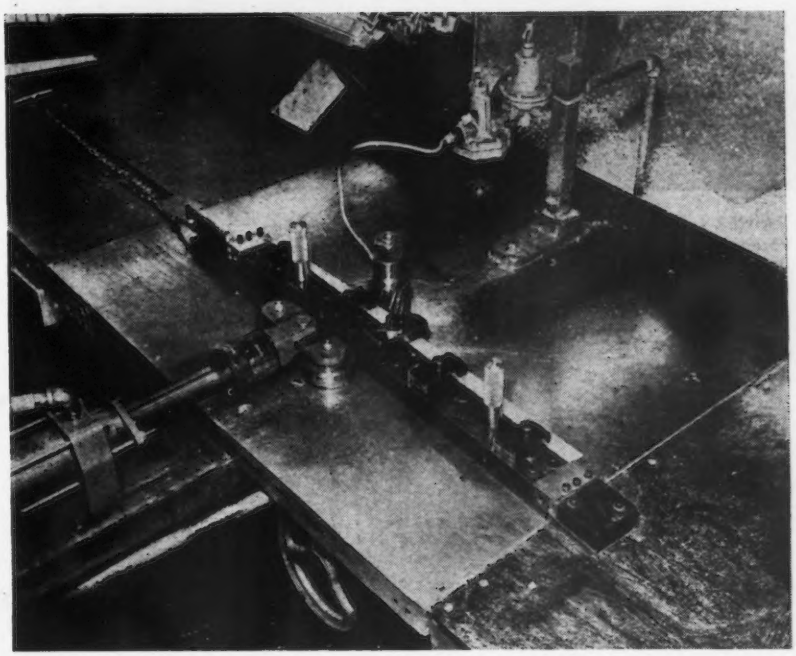
AN increase in production of better than 500 per cent on trimming irregular edges of aircraft parts has resulted at Goodyear Aircraft Corp., Akron, Ohio, through an adaptation of a standard woodworking shaper, equipped with a power feed. Prior to its development, it was necessary to feed the work through the machine by hand, resulting in operator fatigue and a low production rate.

The shaper, illustrated, consists of a flat table with a motor driven spindle projecting through its center, on which are mounted a cutter and a collar of the same diameter (Fig. 2). Shaper blocks are cut to the exact outline of the parts to be trimmed.

Under the supervision of C. B. Mitchella, supervisor of experimental machine and tool design at Goodyear, the attachments shown were installed. The power feed attachment consists of an endless roller chain located in a groove in the top of an extension to the standard shaper table. The chain is driven by a variable speed unit and carries a hook which is attached to one end of the shaper block.

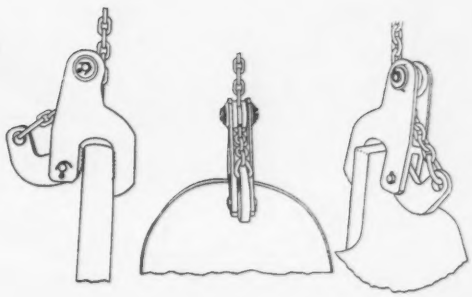
An air cylinder with a roller arrangement on the end of the piston rod is mounted on the front of the shaper table and holds the shaper block against the spindle collar with the proper pressure, while the block is pulled past the cutter.

The shaper has been used successfully on trimming edges of extruded sections, formed sections and parts that have been formed from aluminum alloy sheet on the drop hammer or forming press. The power feed is limited to contour milling of approximately straight sections only.



ROUTING of aluminum extrusions and stacked blanks is speeded up by use of a power driven chain to pull the router block past the shaper cutter under controlled pressure against the follower disk.

A LIFTING clamp, devised in General Electric's Lynn River Works forge division, for forgings, plate stock and other irregular-shaped pieces, makes possible faster and safer handling than the conventional chain-sling lifting method. The device is approximately 12 x 15¾ in., weighs about 50 lb. and will lift up to 1000 lb. The clamp has an inverted Y-shape jaw, one side of which is formed by a cam lever operated on a ⅞ in. drill rod by a ⅜ in. lifting chain. Teeth are cut into both jaws, and the beveled cam lever automatically adjusts the clamp to accommodate objects from 2¼ to 3¼ in. thick. As the tension is taken off the chain, the clamp automatically releases its hold.



# Brazing Speeds Aircraft Construction

STRAINER for an airplane carburetor scoop has a binding brazed around the opening shown, which is brazed to the screen. The mesh of the screen is 4, 6, or 8 to the inch. The metal in the screen and binding is stainless steel. A fixed torch is used and the work is turned around a fixed center by hand.

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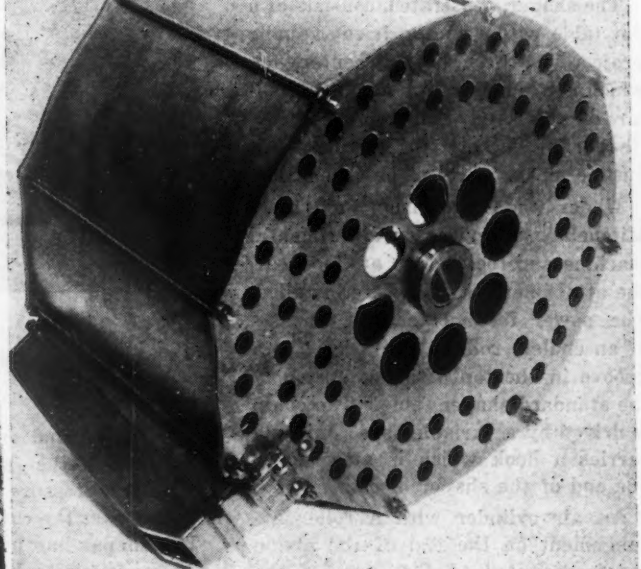
AN airplane is a complex structure, an assembly of members under unprecedented stresses, and operating under unprecedented conditions of service. The primary requirements for the airplane as a whole and its parts, are therefore, strength, resistance to the severest of stresses including shock, impact and vibration, resistance to corrosion and to wide variations in temperature, and last but most important under war conditions, resistance to all imaginable mistreatment ranging from

PLUG used on recuperator gages of 20 mm. guns. It displays a simplicity in design which would be difficult without low temperature silver alloy brazing.



ABOVE

Gun magazine and end plate assembled.

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LEFT

IN gun magazine end plates, spiral steel strips are silver brazed to steel stampings. Assemblies are prepared with 1/32 in. diameter silver alloy wire, preplaced alongside of the spiral groove. The strip is weighted on top to hold it in place in the groove during the heating operation. A gas furnace is used.

air pockets and storms to crash landing and enemy fire.

Obviously, no installation or machine can withstand every and any attack; everything has its limits. So when these limits are exceeded, airplanes like all other overloaded machines, fail.

Nevertheless the airplane is built to withstand, for war purposes, as much abuse as possible. Hence the methods and materials utilized may well be considered for their applicability to other fields.

One of the most useful processes in the assembly of airplane parts is low temperature silver alloy brazing. It is interesting that this operation is used for the severest possible service, and at the same time it is also quick, easy and inexpensive to apply. It not only meets physical and chemical requirements, but it also speeds production and reduces costs of assembly.

An actual count of the number of brazes in a B-17, for example, would

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AIRPLANE instrument fittings are silver alloy brazed to tubing, giving the permanently dependable joints so vital in aircraft.

| Part or Application | Metals Joined | Type of Joint | Alloy Used | Methods, Remarks, etc. |
|---|---|---|---|---|
| Heaters for bomber compartments; heater units | Copper to copper | Lap and butt | Easy-Flo | 3/64 in. wire; torch brazed. |
| Magnet assembly for indicating instruments | Brass to steel to Alnico | Lap | Easy-Flo | ¼ x 0.005 in. Easy-Flo strips. Electric furnace brazing. |
| Ignition shields | Steel to steel | Butt | Easy-Flo | 0.010 in. and 0.020 in. Easy-Flo rings. Conveyor through gas fired furnace. |
| Carburetors | Stainless to stainless steel | Lap | Easy-Flo | 1/16 in. and 0.047 x 3/32 in. Easy-Flo strip. Manual feed; oxy-acetylene gas heat. |
| Spark plug shield | Steel to steel | Butt | Easy-Flo | Induction heating. |
| Oil coolers | Brass to brass | Lap | Easy-Flo | 1/16 in. wire; torch brazed. |
| Aircraft machine gun sights | Brass to brass and steel | Slip | Easy-Flo | 1/16 in. wire; torch brazed. |
| Wing light | Steel to steel | Slip | Easy-Flo | 1/16 in. wire; torch brazed. |
| Propeller | Steel to steel | Lap | Easy-Flo | Torch, furnace and induction brazed; 0.005 in. to 0.010 in. ribbon. |
| Ring for gun mount | Steel to steel for repair of defective welds | Fill in | Easy-Flo | 1/16 in. wire, hand fed; torch brazed. |
| Gear for supercharger; high altitude bomber | Steel to tool steel | Insert lap | Easy-Flo | Salt bath, 1/32 in. wire ring. Brazed and quenched at 1500 deg. F. to harden tool teel collar insert. |
| Fuel injector | Monel to brass to stainless to stainless steel | Slip lap | Easy-Flo | Stationary torch; part revolved; 1/32 in. and 1/16 in. wire rings. Monel screen brazed to brass ring, brazed to stainless tube; stainless plug brazed to open end of tube. |
| Airplane B-17, B-24, B-25; 50 mm. machine gun. B-11 ring sight and A-5 gun post | Steel to steel | Slip lap and lap | Easy-Flo | Torch, hand feed, 1/32 in. wire; nine joints on R.S.; three joints on G.P. parts; assembled in jig and brazed. One joint on G.P., preplaced 0.003 x 1 in. alloy. |
| Gasoline heater for heating aircraft engines. Arctic service pump cylinder | Steel to steel | Slip lap | Easy-Flo | Stationary torch, rotating fixture. Hand feed 1/16 in. wire. Steel plug to steel tube. |
| Auxiliary fuel tanks | Cast brass to terne plate sheet | Lap | Easy-Flo | Torch braze; 1/16 in. wire. |
| Oxygen generators | Brass to brass | Lap | Easy-Flo | Torch braze; 1/16 in. diameter. |
| Thermostatic controls | Stainless steel to brass | Lap | Easy-Flo | 1/16 in. wire; torch braze. |
| Gas tank filler | Chrome-moly steel | Butt | Easy-Flo | Furnace braze; wire rings preplaced. |
| Generator leads | Copper to copper | Lap | Sil-Fos | Incandescent heating using preplaced Sil-Fos ribbon; no flux. |
| Fuel selector valve | Monel to monel | Butt | Easy-Flo | Rotary jig with preheating; 1/16 in. wire; torch braze. |
| Anti-vibration mounts | Steel to SAE 3140 steel | Butt | Easy-Flo | Alloy washers of 0.003 x 1⅝ in. and 0.003 x 1⅝ in. OD. |
| Smoke screen tank | Monel to monel | Lap | Easy-Flo | Torch braze; 3/32 in. wire. |
| Oil coolers and oil temperature control | Copper to brass to bronze castings; also, Monel to Monel to steel or brass | Lap and tubular | Easy-Flo | Torch braze; 1/16 in. and 3/32 in. wire. |
| Air hose coupling | Steel to steel | Tubular, shear joint | Easy-Flo | Furnace brazed parts drive fit—get good penetration — parts also flame hardened next to braze. Used on control lines, etc., up to 12,000 lb. pressure. |
| Hydraulic, knuckle joint on landing gears | SAE 4130 steel to steel | Tubular | Easy-Flo | Induction heat; four joints per assembly; 1/16 in. wire; joint stands 12,000 lb. hydraulic pressure. |
| Controls | Beryllium copper to beryllium copper and brass | Tubular | Easy-Flo | Torch, induction and furnace brazing; 1/16 in., 1/32 in. and 0.026 in. wire. |
| Oxygen cylinder | Steel to steel | Tubular and lap | Easy-Flo | Torch and induction heating. |
| Aircraft struts | Steel to steel | Tubular | Easy-Flo | High strength joints; part of gun turrets. |
| Resistor in grounding lines | Nichrome to brass | Lap | Easy-Flo | For Douglas aircraft. Parts held to close electrical requirements. Parts formerly mechanically fastened; had ambient temperature of 550 deg. F., now 175 deg. F. |

RIGHT

BRASS ignition harnesses for liquid cooled aircraft engines are silver alloy brazed.

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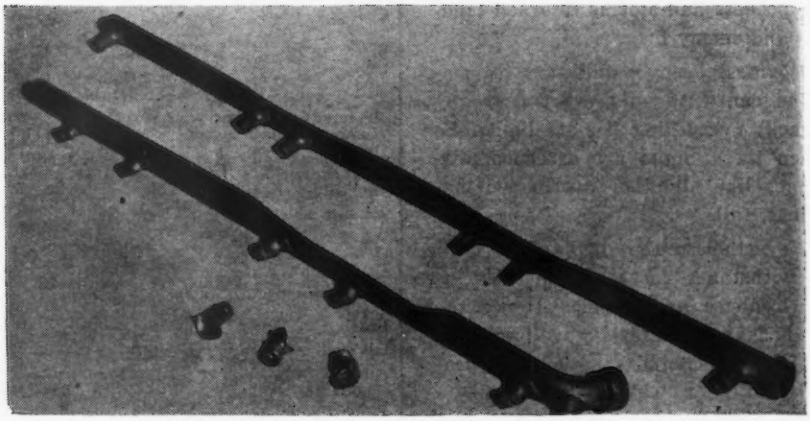
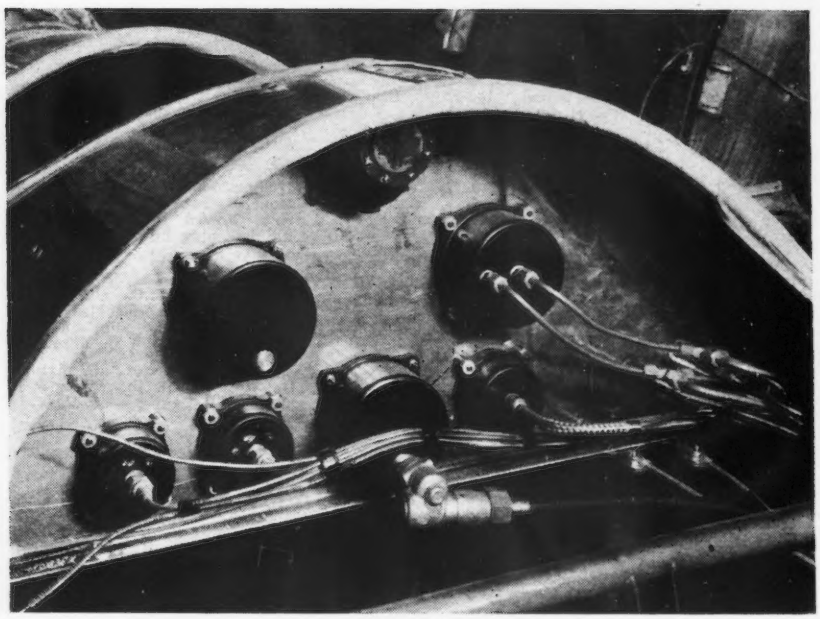
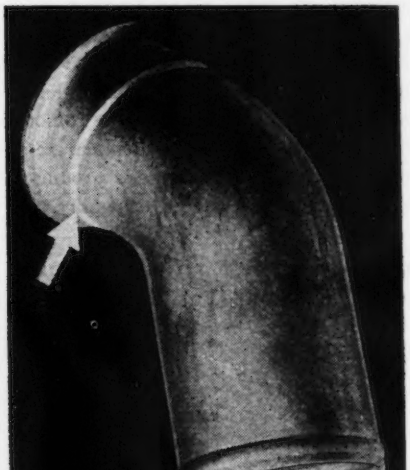
BELOW

THE airplane instrument fittings, silver alloy brazed to tubing, and in place.







IN the coolant elbow for aircraft engines, a simple silver braze is used.

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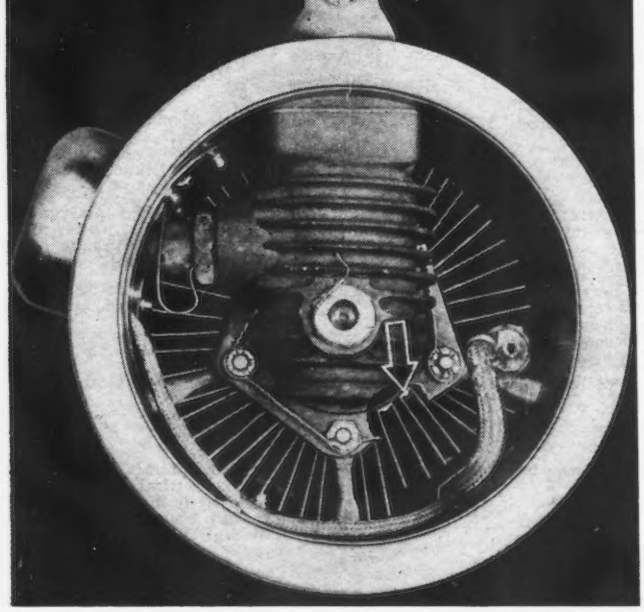

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LEFT

IN the airplane cabin heater the U-shaped fins are joined to heating tubes with Easy-Flo (see arrow). This has been found to be a rapid, low-cost method of construction.

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run literally into several thousand. A short list of some of the most important applications is given in the accompanying table with data describing some of the details of the particular jobs. The accompanying illustrations show several interesting specific instances.

## Catalyst Purifies Gases

THREE palladium catalyst chambers newly developed by Baker & Co., Inc., and known as the Deoxo gas purifiers, have been used successfully by the vacuum tube division of the Federal Telephone & Radio Corporation, Clifton, N. J. Two are being used to remove oxygen from nitrogen and one to remove oxygen from hydrogen.

In a statement regarding the tests made on this apparatus during the past six months, Federal Telephone declared that they have "completely eliminated all maintenance on the deoxidizing stages of our hydrogen and nitrogen purification trains."

# Gearing Lubrication Standard Set Up by AGMA

RECENTLY, through the release of its standard specification "250.01—Lubrication of Enclosed and. Opened Gearing," the American Gear Manufacturers Association, Empire Building, Pittsburgh 22, has met the need which has been markedly felt by manufacturers for this material.

This standard covers the method of lubricating and the type and grade of oil to be used in enclosed gear drives and open gearing. It is applicable to the following types of gearing:

| | |
|---|---|
| Helical | Straight Bevel |
| Herringbone | Spiral Bevel |
| Worm | Spur |
| Hypoid | |

An appendix AGMA standard 250.01A showing a typical list of gear lubricants by trade names also has been prepared by the association. Other oils meeting the specifications of grade and viscosity may be substituted.

These specifications apply only when the gears are designed and rated in accordance with AGMA standards. The ambient temperature range for which they apply is from 0 to 150 deg. F. Gear drives operating outside of this range or those operating in extremely humid or chemical laden atmospheres should be referred to the gear manufacturer or lubricant supplier for his recommendation.

The areas of contact on gear teeth are relatively small and the unit pressures produced in transmitting the loads are relatively high. It is therefore essential to provide a film of lubricant of sufficient strength to withstand the localized pressure during the period of contact. The peripheral speed of the gears governs the period of tooth contact and determines the length of time the film must withstand the pressures. When speeds are high, the time is very short and the loads are usually light and as a result an oil of comparatively low viscosity should be used. When speeds are low and the loads heavy, the contact time is considerably longer and an oil of higher viscosity should be used.

The ambient temperature, which is here defined as the temperature of the air in the vicinity of the gears or gear unit, has considerable bearing on the viscosity of oil to be used. In general, the viscosity of mineral oil varies inversely with the temperature, which fact makes it desirable to use an oil of heavier grade at high ambient temperatures than would be used for the same application operating in a

**Table I—Viscosity Range For Various AGMA Lubricants**

| AGMA Lubricant No. | Viscosity Range S.U.V. Seconds | |
|---|---|---|
| | At 100 deg. F. | At 210 deg. F. |
| 1 | 180 to 240 | ..... |
| 2 | 280 to 360 | ..... |
| 3 | 490 to 700 | ..... |
| 4 | 700 to 1,000 | ..... |
| 5 | ..... | 80 to 105 |
| 6 | ..... | 105 to 125 |
| 7 | ..... | 125 to 150 |
| 7 Comp.* | ..... | 125 to 150 |
| 8 | ..... | 150 to 190 |
| 8 Comp.* | ..... | 150 to 190 |
| 9 | ..... | 350 to 550 |
| 10 | ..... | 900 to 1,200 |
| 11 | ..... | 1,800 to 2,500 |

*The oils marked "Comp." are those compounded with 3 to 10 per cent of acidless tallow or other suitable animal fat.
Oils No. 9, 10 and 11 should be of a tacky adhesive nature so that they will adhere well to the tooth surfaces.

**Table II—Recommended Lubricants for Enclosed Units of All Types Except Worm Gears**

| Type of Units | Size of Units | Ambient Temperature, deg. F. | | |
|---|---|---|---|---|
| | | 0–40 use AGMA No. | 41–100 use AGMA No. | 101–150 use AGMA No. |
| Parallel shaft units | Low speed, centers up to 20 in. | 2 | 4 | 5 |
| | Low speed, centers over 20 in. | 3 | 5 | 6 |
| Planetary gear units | O.D. of housing up to 16 in. | 2 | 3 | 4 |
| | O.D. of housing over 16 in. | 3 | 4 | 5 |
| Gearmotors | All sizes | 2 | 4 | 5 |
| Spiral or straight bevel gear units | Cone distance up to 12 in. | 2 | 4 | 5 |
| | Cone distance over 12 in. | 3 | 5 | 6 |
| High speed units | All sizes | 1 | 2 | 3 |

# Typical Oils Meeting AGMA Recommendation

| NAMES | AGMA #1 | AGMA #2 | AGMA #3 | AGMA #4 | AGMA #5 | AGMA #6 |
|---|---|---|---|---|---|---|
| American Oil Co. | 2903 Amolite #21 | 2906 Amolite #35 | 2930 Amolite #510 | 2908 Amolite #95 (B) | 2909 Amolite #121 (C) | 2933 Amolite #1500 |
| Anderson Co., F. E. | Penna. Turbex Med. (E) | Penna. Turbex Heavy Med. (E) | Penna. Turbex Ex. Heavy (E) | Penna. Turbex AA (E) | Penna. Turbex AA (E) | Penna. Turbex BB (E |
| Arkansas Fuel Oil Co.<br>Associated Oil Co. (Calif.) | Pacemaker #2 (B)<br>Cycol Med. Turbine | Pacemaker #3 (B)<br>Cycol Heavy Turbine | Pacemaker #5 (B)<br>Cycol Motor Oil SAE 30 | Pacemaker #6 (B)<br>Cycol Motor Oil SAE 40 | Pacemaker #7 (B)<br>Veedol Trans. Gear SAE 90 (B) | Pacemaker #8 (B)<br>Veedol Trans. Gear SAE 140 (A) |
| Atlantic Refining Co. | H.F.S. #2 | H.F.S. #3 | H.F.S. Lub. Oil #7 | H.F.S. Lub. Oil #10 | H.F.S. Lub. Oil #13 | H.F.S. Lub. Oil #18(A |
| Carter Oil Co. (Okla.)<br>Cities Serv. Oil Co. (Del.)<br>Cities Serv. Oil Co. (Pa.)<br>Colonial Beacon Oil Co.<br>Continental Oil Co. | ———<br>Pacemaker #2 (B)<br>Penn-Pacemaker #2 (C)<br>Teresso 47 (B)<br>Dectol Lt. Med. (A) | Teresstic 52 (B)<br>Pacemaker #3 (B)<br>Penn-Pacemaker #3 (C)<br>Teresso 52 (B)<br>Dectol Med. (A) | Teresstic 65 (B)<br>Pacemaker #5 (B)<br>Penn-Pacemaker #6 (C)<br>Peresso 65 (B)<br>Dectol Heavy (A) | Teresstic 85 (C)<br>Pacemaker #6 (B)<br>Penn-Pacemaker #7 (C)<br>Teresso 85 (C)<br>Dectol HH (A) | Teresstic 100 (A)<br>Pacemaker #7 (B)<br>Penn-Pacemaker #7 (C)<br>Teresso 100 (A)<br>Dectol Spl. Hvy. (A) | Teresstic 120 (C)<br>Pacemaker #8 (B)<br>Penn-Pacemaker #8 (<br>Teresso 120 (C)<br>Dectol X Hvy. (A) |
| Fiske Bros. Refining Co.<br>Gulf Refining Co.<br>Houghton & Co., E. F. | Empire Engine Oil 10 Lt. (E)<br>Harmony B (B)<br>Hydro-Drive MIH-10(B) | Empire Engine Oil 20 Med. (E)<br>Harmony C<br>Hydro-Drive MIH-20 | Empire Engine Oil 30 Hvy. (D)<br>Harmony Oil E<br>Hydro-Drive MIH-30 | Empire Engine Oil 40 Ex. Hvy. (D)<br>Parvis Oil A (A)<br>Hydro-Drive MIH-40 | Empire Engine Oil 50 A (D)<br>Parvis Oil B (B)<br>Hydro-Drive MIH-50 | Empire Engine Oil 60 AA (D)<br>I-C Oil A (B)<br>Hydro-Drive MIH-60 |
| Humble Oil Co.<br>Keystone Lubricating Co. | Velvet CC 47 (B)<br>AG #1 | Velvet CC 58 SAE 20 (A)<br>AG #2 | Velvet CC 65 SAE 30 (A)<br>AG #3 | Velvet CC 75 SAE 40 (B)<br>AG #4 | Velvet CC 85 SAE 50 (B)<br>AG #5 | Velvet CC 120 SAE 60<br>AG #6 |
| National Refining Co.<br>New York-New Jersey Lub. Co. | Enarco Lub. G-1<br>#2002 Non-Fluid Oil | Enarco Lub. G-2<br>#1003 Non-Fluid Oil | Enarco Lub. G-3 (E)<br>#1005 Non-Fluid Oil | Enarco Lub. G-4 (E)<br>#1007 Non-Fluid Oil | Enarco Lub. G-5 (E)<br>A#110 Non-Fluid Oil | Enarco Lub. G-6 (E)<br>#1030 Non-Fluid Oil |
| Ohio Oil Co. | #465 Darol (C) | 403 Marathon R.G. Oil | 408 Marathon R.G. Oil | 412 Marathon R.G. Oil | 420 Marathon R.G. Oil | 433 Marathon R.G. O |
| Pennzoil Co. | Pennzoil Motor SAE 10 | Pennzoil Motor SAE 20 | Pennzoil Motor SAE 30 (D) | Pennsoil Motor SAE 40 (D) | Pennzoil Motor SAE 50 (D) | Pennzoil Motor SAE 60 (D) |
| Penola, Inc. | Teresstic 47 (B) | Teresstic 52 (B) | Teresstic 65 (B) | Teresstic 85 (C) | Teresstic 100 (A) | Teresstic 120 (C) |
| Phillips Petroleum Co.<br>Pure Oil Co.<br>Richfield Oil Corp. | Condor 1006 (A)<br>Puritan C.T., Med.<br>Eagle Oil Ex. Lt. | Condor 1008 (A)<br>Puritan C.T., Hvy. Med.<br>Eagle Oil Medium | Condor 1010 (A)<br>Puritan Heavy (D)<br>Richfield Eagle Oil Med. Hvy. (B) | Condor 1012 (A)<br>Puritan Spl. Hvy. (D)<br>Richfield Eagle Oil Hvy. (B) | Condor 1014 (A)<br>Puritan Ex. Hvy. (E)<br>Richfield Eagle Oil Ex. Hvy. (A) | Condor 1016<br>Puritan Super Hvy. (D<br>Richlube Motor Oil SAE 60 |
| Shell Oil Corp. (Calif.)<br>Shell Oil Corp., Inc. (N.Y.) | Carnea #29<br>Albus Oil #29 | Carnea Oil #34<br>Albus Oil #34 | Carnea Oil #41<br>Albus Oil #41 | Carnea Oil #69<br>Albus Oil #72 | Carnea Oil #72<br>Albus Oil #72 | Carnea Oil #74<br>Albus Oil #75 |
| Sinclair Refining Co. | Cordymo (B) | Rubilene Lt. Med. | Rubilene Med Hvy. (B) | Rubilene Heavy | Rubilene X Hvy. (A) | Rubilene Super Heavy |
| Skelly Oil Co. | Skelco SAE 10 | Skelco SAE 20 | Skelco SAE 30 | Skelco SAE 40 | Skelco SAE 50 | Skelco SAE 60 |
| Standard Oil of Calif. | Calol Turbine | Calol Turbine Heavy | Calol Turbine Oil #19 | Calol Diesel Eng. Oil #65 | Zeroline Gear Oil 90 (A) | Calol Deterbo Lub. Oil #60 |
| Standard Oil of Indiana<br>Standard Oil of Kentucky | Stanoil #18<br>——— | Stanoil #31<br>Teresso 52 (B) | Stanoil #51<br>Teresso 65 (B) | Stanoil #95 (A)<br>Teresso 85 (C) | Stanoil #120 (B)<br>Teresso 100 (A) | Stanoil #200 (D)<br>Teresso 120 (C) |
| Standard Oil of Louisiana<br>Standard Oil of N. J.<br>Standard Oil of Penna.<br>Sun Oil Co.<br>Swan-Finch Oil Corp. | Teresso 47 (B)<br>Teresso 47 (B)<br>Teresso 47 (B)<br>Solnus Lt. Med.<br>Safco Ambient C | Teresso 52 (B)<br>Teresso 52 (B)<br>Teresso 52 (B)<br>Solnus Medium<br>Safco Ambient C | Teresso 65 (B)<br>Teresso 65 (B)<br>Teresso 65 (B)<br>Solnus Heavy Medium<br>Safco Ambient D | Teresso 85 (C)<br>Teresso 85 (C)<br>Teresso 85 (C)<br>Solnus Heavy<br>Safco Ambient E | Teresso 100 (A)<br>Teresso 100 (A)<br>Teresso 100 (A)<br>Solnus Ex. Hvy.<br>Safco Ambient F | Teresso 120 (C)<br>Teresso 120 (C)<br>Teresso 120 (C)<br>Pittsburgh Cyl. Oil (H<br>Safco Dytac G (C) |
| Texas Co.<br>Tidewater Associated Oil Co. (N. Y.)<br>Union Oil Co. of Calif. | Havoline SAE 10<br>Tycol Med. Turbine (E)<br>Unacal Turbine Oil Lt. | Havoline SAE 20<br>Tycol 520<br>Unacal Truck-Bus Oil 20 (A) | Havoline SAE 30<br>Tycol Heavy (C)<br>Unacal Truck-Bus Oil #30 | Havoline SAE 40<br>Tycol Spl. Hvy. (E)<br>Unacal Truck-Bus Oil #40 (A) | Havoline SAE 50<br>Veedor Super Film 90<br>Unacal Truck-Bus Oil #50 (A) | Havoline SAE 60 (A)<br>Tycol Ex. Hvy (E)<br>Motoreze #60 (C) |
| United Oil Co. of Pittsburgh, Pa.<br>Valvoline Oil Co. | Oil #210<br>E.T.C. #10 | #1693<br>E.T.C. Extra Med. | Oil #903 (E)<br>Valvoline E.T.C. Hvy. Med. (B) | Oil #1274 (E)<br>Valvoline E.T.C. Hvy.(B) | Oil #910 (E)<br>Valvoline E.T.C. Spl. Hvy. (C) | Oil #1058 (E)<br>Valvoline E.T.C. Ex. Hvy. (C) |
| Waverly Oil Co. | Gearoil #661 | AGMA #2 | AGMA #3 (A) | AGMA #4 (B) | AGMA #5 (D) | AGMA #6 (F) |

(A)—Pour point 5 deg. F. (B)—Pour point 10 deg. F. (C)—Pour point 15 deg. F. (D)—Pour point 20 deg. F. (E)—Pour point 25 deg. F.

low ambient temperature. Also, for low temperatures an oil must be selected which has a pour point lower than the minimum temperature expected for the application.

Where the operating temperature for any one application varies more than 80 deg. F., a viscosity index (Dean and Davis) of 60 minimum is desirable. For ordinary applications, a viscosity index of 20 minimum is satisfactory. The viscosity range for the various AGMA lubricants is shown in Table I. The oils specified by number for the various types of gearing and ambient temperatures must be within this viscosity range.

Lubricating oils for use with gears and gear units should be high grade, high quality well refined petroleum oils. They must not be corrosive to gears, or to ball, roller or sleeve bearings. They must be neutral in reaction, free from grit or abrasives, and have good defoaming properties. For high operating temperatures they must have good resistance to oxidation.

Lubricants of the straight mineral type are to be used for all except worm and hypoid gears. For worm gears, additions of 3 to 10 per cent of acidless tallow or similar animal fats are desirable. For hypoid gears, an acceptable grade of extreme pressure lubricant is recommended. For applications where loads, speeds or temperatures are abnormal, it may be necessary to use oils with special additives.

## Enclosed Gear Units

The recommendations which follow cover the lubrication of enclosed gear units of all types within the range of sizes of commercial enclosed gear drives. They are applicable to enclosed gear drives in which the high speed shaft rotates within a nominal speed range of 600 to 1800 r.p.m. One exception to this is high speed gear units which normally operate at speeds higher than 1800 r.p.m. The recommendations for these are shown in Table II.

For spur, helical and herringbone gearing, the recommendations as

# for Lubricating Enclosed and Open Gearing

| AGMA #7 | AGMA #7 Compounded | AGMA #8 | AGMA #8 Compounded | AGMA #9 | AGMA #10 | AGMA #11 |
|---|---|---|---|---|---|---|
| 2911 Amolite #200 | 2941 Amolite Worm Gear Comp. #4 (D) | 2914 Amolite #305 | 2944 Amolite Worm Gear Comp. #5 | 226 Vesuvius Comp. #1 | 226B Vesuvius Comp. #1B | 227 Vesuvius Comp. #2 |
| Turbex CC | Turbex CCX (F) | Turbex DD | Penna. Turbex DDX | ——— | ——— | ——— |
| Pacemaker #9 | Optimus #6 (C) | Pacemaker #10 | Optimus #5 | Cisco Comp. #0 | Cisco Comp. #1 | Cisco Comp. #2 |
| Cycol 590 Mineral Cylinder | Veedol Superfilm #140 | Veedol Trans. Gear SAE 250 | Veedol Superfilm #250 | Cycol Maclac Comp. #0 | Cycol Maclac Comp. #1 | Cycol Maclac Comp. #2 |
| H.F.S. Lub. Oil #40 | Mogul Cyl. Oil (E) | H.F.S. Lub. Oil #40 | Capital Cylinder Oil | Atlantic Lubricant #81 | Atlantic Lubricant #82 | Atlantic Lubricant #83 |
| Teresstic 140 | 1943 Cylinder Oil | 1705 Cylinder Oil | 1949 Cylinder Oil | Surett Comp. #310 | Surett Comp. #800–#1500 | Surett Comp. #2500 |
| Pacemaker #9 | Optimus #6 (C) | Pacemaker #10 | Optimus #5 | Cisco Comp. #0 | Cisco Comp. #1 | Cisco Comp. #2 |
| Penn-Pacemaker #9 | Penn-Optimus #6 (F) | Penn-Pacemaker #10 | Penn-Optimus #3 | Cisco Comp. #0 | Cisco Comp. #1 | Cisco Comp. #2 |
| Teresso 140 | Cylesso T 140 (K) | Valesso 150 | Cylesso T 190 | Surett Comp. #310 | Surett Comp. #800–#1500 | Surett Comp. #2500 |
| Inca Mineral Cyl. Oil | Inca Cyl. Oil (D) | Zuni Mineral Cyl. Oil | Zuni Cylinder Oil | Coglube #5 | Coglube #7 | Coglube #9 |
| Empire Engine Oil 70 AAA | Empire Engine Oil XAAA (C) | Empire Engine Oil 70 Spl. | Empire Engine Oil X70 Spl. | Ferrol Economizer #9 | Ferrol Economizer #10 | Ferrol Economizer #11 |
| I-C Oil B | Senate Cyl. Oil A (1) | I-C Oil C | Senate Cylinder Oil C | Tubedra Oil | Gulf Lubcote #1 | Gulf Lubcote #3 |
| Hydro-Drive MIH-70 | Med. Worm Gear Oil | Cosmolubric Gear Oil #140 | Med. Worm Gear Oil | Vital #670 E.P. | Cable Oil #1 | ——— |
| Velvet CC 140 SAE 70 | Cylesso Oil T 140 (E) | Canthus 160 | Cylesso T 190 | Rail Preserving Oil | Surett Comp. #1100 | Surett Comp. #2000 |
| AG #7 | AG #7C | AG #8 | AG #8C | AG #9 | AG #10 | AG #11 |
| Enarco Lub. G-7 | Enarco Lub. GC-7 (D) | Enarco Lub. G-8 | Enarco Lub. GC-8 | Enarco Lub. G-9 | Enarco Lub. G-10 | Enarco Lub. Oil |
| D17 Non-Fluid Oil | D17 Cmp. Non-Fluid Oil (B) | D-18 Non-Fluid Oil | D18 Cmp. Non-Fluid Oil | B-#509 Non-Fluid Oil | B-#510 Non-Fluid Oil | B-#57 Non-Fluid Oil |
| 437 Marathon R.G. Oil | 104 Marathon S.C. Oil (D) | 440 Marathon R.G. Oil | 78 Marathon S.C. Oil | 564 Marathon Gear Shield | 565 Marathon Gear Shield | 566 Marathon Gear Shield |
| Pennzoil Motor SAE 70L | Pennzoil Motor SAE 70L & C5 (D) | Pennzoil Motor SAE 70H | Pennzoil Motor SAE 70H & C5 | Penn-American Gear Shield #00 | Penn-American Gear Shield #0 | Penn-American Gear Shield #1 |
| Teresstic 140 | 1943 Cyl. Oil (K) | 1705 Cylinder Oil | 1949 Cylinder Oil | Surett Comp. #310 | Surett Comp. #800–#1500 | Surett Comp. #2500 |
| Hector Mineral 6006 | Hector S 6008 (C) | Andes Mineral 6012 | Andes S 6014 | Philstik #0 | Philstik #1 | Philstik #2 |
| Pure (C) Mineral | Perfect Valve (E) | H. Mineral Oil | 650 Z Cylinder | Poco #50 Comp. | Poco #100 Comp. | Poco #200 Comp. |
| Richfield Eagle Oil Ultra Hvy. | Richfield Cyl. Oil W.S. (L) | Superheat Mineral Valve Oil | Richfield Superheat Valve Oil | Richcote Lubricant 500 | Richcote Lubricant Heavy | Richcote Lub. H. H. |
| Valva Oil #76 | Wolco Oil #77G (A) | Wolco Oil #79 | Wolco Oil #79J | Shell Cardium Comp. #5 | Shell Cardium Comp. #10 | Shell Cardium Comp. #20 |
| Valva Oil #76 | Valva Oil #77E (A) | Valva Oil #79 | Wolco Oil #79J | Shell Cardium Comp. #5 | Shell Cardium Comp. #10 | Shell Cardium Comp. #20 |
| Rubilene Ultra Hvy. | Modoc Cyl. Light (D) | Sinclair Mineral Valve DK | Superheat Valve | Onyx 500 | Onyx H | Onyx HH |
| Tagolene SAE 70 | Skelly #5065 C Gear Oil (A) | Skelly #6150 Gear Oil | Skelly #6150 C Gear Oil | Bitumin Comp. #400 | Bitumin Comp. #1 | Bitumin Comp. #2 |
| Calol Cyl. Oil 150 P | Calol Cyl. Oil 140 PX (F) | R.P.M. Gear Oil 140 | Calol Cyl. Oil 190 PX | Calol #0 Pinion | Calol #1 Pinion | Calol #2 Pinion |
| Stanoil #220 | Std. Worm Gear Oil (G) | Superla Min. Cyl. Oil | Calumet Cyl. Oil | Calumet Comp. #5 | Calumet Comp. #7 | Calumet Comp. #9 |
| Teresso 140 | Cylesso T 140 (K) | Valesso 150 | Cylesso T-190 | Gearsite 31 | Gearsite 80-150 | Gearsite #250 |
| Teresso 140 | Cylesso T 140 (K) | Valesso 150 | Cylesso T-190 | Surett Comp. #310 | Surett Comp. #800–#1500 | Surett Comp. #2500 |
| Teresso 140 | Cylesso T 140 (K) | Valesso 150 | Cylesso T-190 | Surett Comp. #310 | Surett Comp. #800–#1500 | Surett Comp. #2500 |
| Teresso 140 | Cylesso T 140 (K) | Valesso 150 | Cylesso T-190 | Surett Comp. #310 | Surett Comp. #800–#1500 | Surett Comp. #2500 |
| Pittsburgh Cyl. Oil | Occident Cyl. Oil (M) | Monitor Cyl. Oil | H.V. Cylinder Oil | Gear Compound C | Gear Compound B | Gear Compound B-2 |
| Safco Dytac H | ——— | Safco Dytac I | ——— | Safco Gear Comp. #2 | Safco Gear Comp. #3 | Safco Gear Comp. #4 |
| Texaco Motor SAE 70 | Texaco Honor Cyl. Oil (H) | Thuban #140 | Leader Valve Oil | Texaco Crater 0 | Texaco Crater 1 | Texaco Crater 2 |
| Tycol #503 | Tycol Valve (E) | Tycol EHF | Tycol G.A. | Tycol Compound #910 | Tycol Compound #930 | ——— |
| Motoreze Worm Gear #140 | ——— | Pure Penn Worm Gear #140 | ——— | Red Line Cable Lub. | Red Line Dark Pinion Grease | Red Line Dark Pinion Hvy. |
| Oil #1229 | Oil #1229 Comp. (E) | Oil #32 | Oil #32 Comp. | #1577 | ——— | ——— |
| Valvoline E. T. C. Super Hvy. | Valvoline Eboline Cyl. Oil (K) | Valvoline X600 Steam Ref. Cyl. | Valvoline RR Cylinder Oil | AGMA #9 | Perfection Comp. Light | Perfection Comp. Med. |
| AGMA #7 | AGMA #7 Comp. (M) | AGMA #8 | AGMA #8 Comp. | Gear Lub. #40½ | Gear Lub. #41 | Gear Lub. #42 |

(F)—Pour point 30 deg. F. (G)—Pour point 35 deg. F. (H)—Pour point 40 deg. F. (K)—Pour point 45 deg. F. (L)—Pour point 50 deg. F. (M)—Pour point 60 deg. F.

shown apply only to gears cut after heat treatment. If they are heat treated after cutting, the next higher AGMA lubricant number is to be used for a given unit size and ambient temperature.

The recommendations as shown for units using straight or spiral bevel gears are for gears heat treated either before or after cutting.

Lubrication recommendations are given in Table II which shows the grade of oil to use for drives of all types except those employing worm gears; this latter group is covered by Table III.

When operating in the 0 to 40 deg. F. range of ambient temperature, the lubricant selected must have a pour point below the lowest temperature expected.

To obtain long life from a gear unit, it is necessary that the oil be clean and free from sludge at all times. To be assured of this, the oil must be changed at regular intervals.

For a new unit the oil should be drained at the end of two weeks' operation and the case thoroughly flushed with light flushing oil. For refilling, the original oil can be used if it has been filtered, otherwise new oil must be used. After this, a change of oil every 2500 hr. of operation or every six months, whichever occurs first, is sufficient for units operating under normal conditions. Where operating conditions are severe, such as a rapid rise and fall in temperature of the gear case with accompanied sweating of the inside walls and resulting formation of sludge, or where operations is in moist or dusty atmospheres or in the presence of chemical fumes, it may be necessary to change the oil at intervals of 1 to 3 months.

Sludge in gear units may be caused by metallic particles ground off the gears, from dust and dirt and by the presence of moisture or chemical fumes. Therefore, every precaution should be taken to prevent water and foreign particles from entering the gear case.

The recommendations which follow

cover the lubrication of open and semi-enclosed gearing of all types and are applicable to gears operating at moderate and slow speeds. The maximum permissible speed is that at which the lubricant will adhere to the teeth and will vary with the application and operating conditions. These recommendations cover oil lubrication of gears as distinguished from grease lubrication. The oil used may, however, contain special additives to increase its adhesiveness.

### Lubrication of Open Gears

Various methods have been devised for the lubrication of open gearing because of the wide range of applications in which they are used. These methods can, however, be grouped in two general classes which are as follows:

(A) SLUSH PAN LUBRICATION:

This method of lubrication is recommended for high grade heavily loaded gears operating at moderate and slow speeds. It involves the use of a slush pan mounted below one of the gear elements in a position such that a number of gear teeth are submerged in oil. As the gear rotates a small amount of lubricant clings to the teeth and is carried into the mesh.

The oil used should be of a tacky nature so that it adheres well to the tooth surfaces. It should be heavy bodied but not so heavy as to channel in the pan.

(B) HAND LUBRICATION:

*Hot—by brush or pouring:* On applications where a slush pan is impractical, this method of lubrication is recommended for moderate speeds and heavy loads or when gears are operating at elevated temperatures. It consists of heating the lubricant to a temperature such that it flows freely and is then applied to the gears with a brush or by pouring. An extremely adhesive lubricant should be used.

*Cold—by brush or pouring:* This method of lubrication is recommended only for slowly moving and roughly cut or cast teeth carrying comparatively light loads. It consists of applying the lubricant to the gears with either a brush or paddle. The oil used should be adhesive in nature so it will stay on the teeth.

*Hand oiled:* This type of lubrication is limited to small gears which are used principally for motion transmission where the loads are very light. The oil is applied by merely pouring on the gear teeth.

Table IV shows the proper AGMA number to use for open gearing of all types.

**Table III—Recommended Lubricants for Enclosed Worm Gear Units Only**

| Service and Worm Speed | Ambient Temperature, deg. F. | | |
|---|---|---|---|
| | 0–40 use AGMA No. | 41–90 use AGMA No. | 91–120 use AGMA No. |
| Intermittent operation *All worm speeds | 5 | 5 | 7 Comp. |
| Continuous operation Worm speeds below 600 r.p.m. | 7 Comp. **Diluted | 8 Comp. | 8 Comp. |
| Continuous operation Worm speeds 600 r.p.m. and over | 7 Comp. **Diluted | 7 Comp. | 8 Comp. |

*Where period of operation is insufficient to produce any appreciable rise in oil bath temperature.

**Diluted AGMA No. 7 comp. oil should be diluted with a lighter oil, preferably not exceeding 500 sec. viscosity at 100 deg. F., until the desired fluidity is obtained. The lubricant used for dilution should be of the same basic crude as that of the recommended oil. The lubricant supplier should be consulted if there is any doubt.

### Maintenance

Because open gearing comprises so many types and is used under such a wide range of operating conditions, it is difficult to make recommendations applicable to all situations. Often such gears are protected by dust excluding sheet metal housings while others have no covering.

For slush pan lubrication, the oil should be changed once every six months for applications where it is not subject to dust or contamination. Where dust or an excessive amount of moisture is present, the oil should be changed every two to four months.

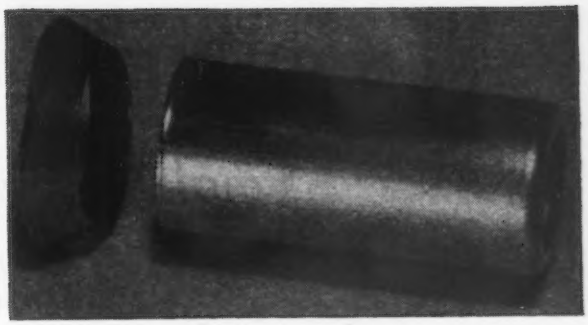
All hand lubricated gearing depends on the periodic application of oil to the gears to maintain a constant film. The frequency of application depends on speed, load and operating condition and may vary from 1 hr. where speeds and loads are high to 24 hr. for lightly loaded slow speed drives. The proper intervals between applications can be determined only by inspection of the tooth surfaces.

Gears operating in dusty atmospheres should be periodically cleaned with kerosene or other suitable solvent. The dirt and grit adhering to them can seriously damage the tooth surfaces if it continuously passes through the mesh.

**Table IV—Recommended Lubricants for Open Gearing All Types Except Worm Gears**

| Method | Ambient Temperature, deg. F. | | |
|---|---|---|---|
| | 0–40 use AGMA No. | 1–100 use AGMA No. | 101–150 use AGMA No. |
| Slush Pans | 3 | 5 | 6 |
| Hot—by brush or paddle | 10 | 10 | 11 |
| Cold—by brush or paddle | 6 | 8 | 10 |
| Hand oiled | 4 | 6 | 8 |
| | | Worm Gears Only | |
| Cold or hot—by brush or paddle | 6 | 8 | ..... |

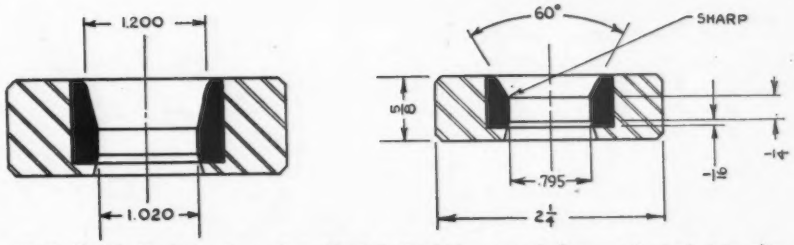
# Thin Gage Sheet Deep Drawn With Carbide Dies



• • Radio tube shield drawn from tin plated steel 0.011 to 0.012 in. thick.

DEEP drawing dies of cemented carbide are currently giving unexpectedly good results in the production of cases for radio tubes. Here, on an operation where 100,000 pieces per die gives profitable performance, some of the carbide dies have turned out as many as 750,000 pieces—400 per cent more than was calculated before these dies were installed.

The material being drawn is tin plated sheet steel, 0.011 to 0.012 in. thick. Disks, 2 9/16 in. in diameter are blanked and cupped in two operations. The first cup is 1 5/32 in. o.d. and 1⅛ in. high. The first draw is in the carbide die illustrated at the left in the sketch. The cup is then 1.020 in. o.d. and 1½ in. high. The second draw is through the die shown at the right. Its diameter is 0.795 in. and the draw angle is not blended but is cut to a 60 deg. included angle for pinch and trim. The cup is then finish drawn at size 0.795 by 1 11/16 in. high and with a 0.010 in. wall. The trimmed mouth of the cup is very clean and even as seen in the photograph.




• • (Left) Carbide draw die. (Right) Carbide second draw and pinch trim die converted from a Carboloy standard A-25 nib.

Some of the cemented carbide dies of the 1.020 in. diameter have run as high as 750,000 pieces. One of the 0.795 in. diameter dies has, to date, exceeded 100,000 draws and is still turning out excellent grade work. It is also interesting to note that the changeover to carbide dies was made within a single week, all machines being equipped in this time by the use of Carboloy stock dies, converted where necessary.

# Lacquer-Like Plastic Protects Metals

A VINYL-RESINOUS-BASE thermosetting plastic known as Plastipeel is being used by Consolidated Vultee Aircraft Corp. for the protection of metals such as steel, aluminum, and magnesium. Plastipeel is a cold-spray material which can be applied like paint by spraying, brushing or dipping. At room temperatures, it dries in about 20 min., leaving an extremely tough film.

Normally, the Plastipeel film is transparent; but it can be dyed for any color. When applied to materials such as metals and glass, it will prevent corrosion, scratches and mars; yet unless it has been cured with heat, it can be easily peeled off with the fingernails.

If the peeling tendency is not desired, the Plastipeel film can be made "permanent" by heating to 140 deg. F. for a period of 15 min.; and in this condition, it can be removed only with solvents, the action of which requires about 2 min.

Probably the most noteworthy characteristic of Plastipeel is the fact that it can be used on sheet metals in the process of forming. Regardless of whether it is cured with heat, the film will not be disturbed, even when the sheet is severely bent.

Plastipeel costs about the same as the slushing compounds normally used to prevent metal corrosion. It is manufactured for Consolidated Vultee by Duorite Plastic Industries, Culver City, Calif.

• • Shown in this photograph are two aluminum alloy specimens that have been coated with Plastipeel. Although the specimen at the left has been abruptly bent, the Plastipeel film is undisturbed in all areas except where it is being peeled off.

# New Equipment . . .

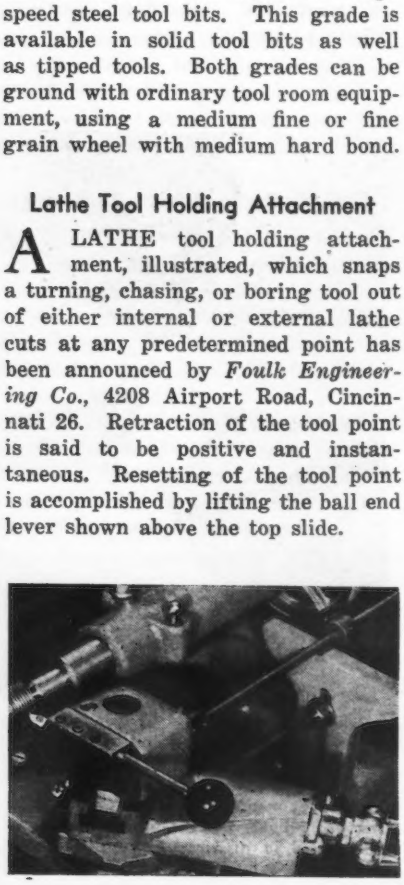
## Small Tools

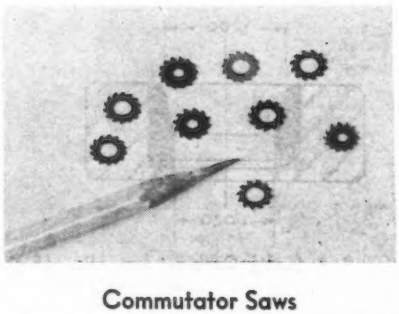
***. . . Recent developments in cutting tools, fastening devices, holding fixtures and markers are described in the following pages.***

TOOL bits made of a new ferrous alloy, Borcoloy (boron-cobalt-alloy), which is claimed to have outstanding wear resistance hardness characteristics, have been announced by *General Aircraft Equipment, Inc.*, South Norwalk, Conn. Two grades of Borcoloy are available, Grade 5 and 6. Grade 5 with 12 per cent cobalt is recommended for hogging and heavy duty cutting on high alloy steels, heat treated bar stock or forgings. Its red hardness enables it to hold a keen cutting edge at very high temperatures. This grade is used only for solid tool bits. Grade 6 with 20 per cent cobalt is recommended for rough turning work as well as for fine finishing at speeds too high or on material too abrasive for high speed steel tool bits. This grade is available in solid tool bits as well as tipped tools. Both grades can be ground with ordinary tool room equipment, using a medium fine or fine grain wheel with medium hard bond.

### Lathe Tool Holding Attachment

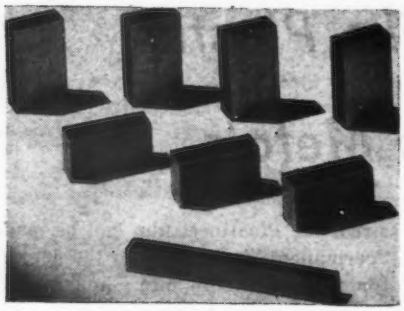
A LATHE tool holding attachment, illustrated, which snaps a turning, chasing, or boring tool out of either internal or external lathe cuts at any predetermined point has been announced by *Foulk Engineering Co.*, 4208 Airport Road, Cincinnati 26. Retraction of the tool point is said to be positive and instantaneous. Resetting of the tool point is accomplished by lifting the ball end lever shown above the top slide.





### Commutator Saws

THE development of a line of solid tungsten carbide commutator saws ranging in sizes from ¼ to 1 in. in diameter and available in thicknesses from 0.015 in. up has been announced by *Super Tool Co.*, 21650 Hoover Road, Detroit 13. The extreme hardness of tungsten carbide is said to provide exceptional clean cuts, long cutter life and is said to eliminate the filling operation often necessary after the use of other tools.



### Tool Tips

A LINE of tools tips made of Hardsteel and designed for brazing into steel shanks has been announced by *Black Drill Co., Div. of Black Industries*, Cleveland. The bits are made in all standard sizes and are available from stock. Special sizes for unusual applications can also be supplied. These bits are made of the same Hardsteel material as used for drills for hardened steel. They are intended for machining the harder and tougher steels and abrasive non-ferrous alloys.

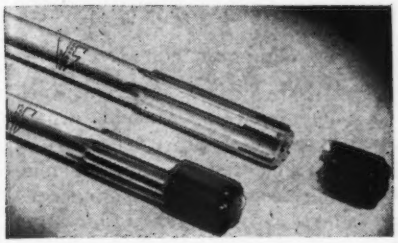
### High Speed Steel

A HIGH speed steel, Rex M-2, which is said to give a superior performance in all operations for which a general purpose high speed stel is required has been announced by *Crucible Steel Co. of America*, 405 Lexington Avenue, New York 17. It is a tungsten-molybdenum steel and is claimed to have a wider hardening range than other molybdenum type speed steels. It has good red hardness and outstanding toughness characteristics. Typical applications are for lathe, planer and boring tools, milling cutters, hobs, form and threading tools, twist drills, end mills, taps, reamers, broaches and chasers.

### Hollow Mill Blades

TRI-BIT cutter blades have been announced by *Weddell Tools, Inc.*, Rochester 7. The triangular tool bits fit into triangular shaped holes in a hollow mill cutter body, each locked or unlocked by a single lock screw. The blades are backed up and adjusted by single adjusting screws or all may be simultaneously adjusted by a single adjusting nut. There are no slots in the cutter body as the cutter blades fit into holes which permit the cutter body to be tied together all around the diameter, giving maximum strength in a minimum diameter. The mills are furnished with standard blades of high speed steel, cast alloys or carbide tipped. They are made

solid shank, shell type, with special piloting bodies, or to incorporate drills or reamers.



### Plastic Cover for Carbides

TO protect carbide tipped tools in transit or in stockroom or toolroom bin, a plastic coating has been applied to each tip according to an announcement by *Wendt-Sonis Co.*, Hannibal, Mo. Although the covering is air and moisture proof after initial application, it will not leave any gummy residue on working surfaces when removed it is said.

### Boring Bar

A PRECISION lever-lock bearing bar has been announced by *Robert H. Clark Co.*, 9330 Santa Monica Boulevard, Beverly Hills, Cal. Presented as a companion tool to the Clark adjustable tool holder, the bor-

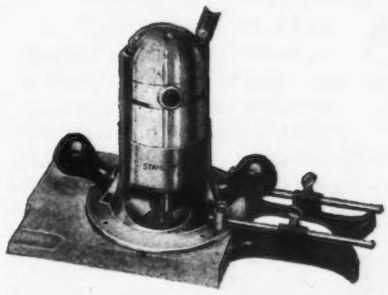
ing bars are available in sets of four, 3/16 x 5, ¼ x 6, ⅜ x 7 and ½ x 8 in. The bars are designed for use without bushings or adaptors. Parallel tool holders hold them securely. The lever lock securely grips the tool bit in such a way that boring or threading to the bottom of the hole is possible without interference from set screws.

### Electric Drill

A SIDE handle type portable electric drill 20 per cent lighter than comparably rated drills with aluminum casings has been announced by *Independent Pneumatic Tool Co.*, 600 West Jackson Boulevard, Chicago 6. The gear case, field case and handle are molded of Thorite plastic. The side handle drills are available in three speeds 2500, 3750 and 5000 r.p.m., weigh 3½ lb. and are 7 9/16 in. in length.

### Hand Router for Wood

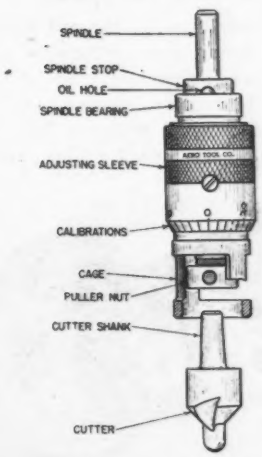
AN improved design in its No. 10A hand router which is used for routing, relief work, carving, inlays and, with attachments for dovetails, for beading and fluting, templet work and for many shaping operations has been announced by *Stanley Electric Tools*, New Britain, Conn. The motor



is universal, ⅜ hp. with speed of 18,000 r.p.m., producing a smooth finish on wood surfaces. Features of the router include a push button shaft lock for changing bits or cutters or for removing or replacing chuck or shaper spindle. The heavy duty, double pole switch is fully protected and is readily accessible for easy replacement. The switch lever is lodged in a recessed section of the housing so that it will not turn on accidentally.

### Micrometer Stop Countersink

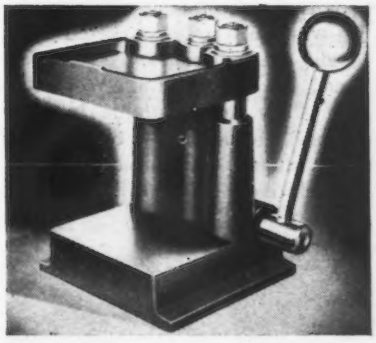
AN improved micrometer stop countersink which involves the elimination of the conventional split keeper, the addition of an oversize phosphor bronze radial bearing and the installation of a simplified puller nut to remove the cutter, has been an-




nounced by *Aero Tool Co.*, Burbank, Cal. Frictional heat is said to be reduced to a minimum as a result of the bronze bearing.

### Air Drill

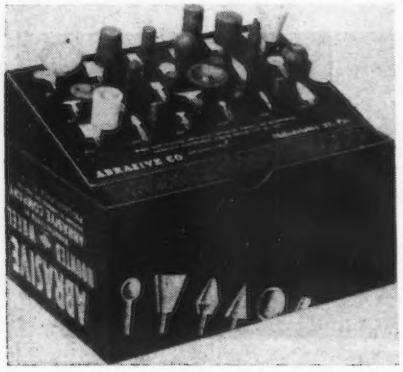
A LINE of powerful air drills with one-piece aluminum housing has been announced by *Aro Equipment Corp.*, Bryan, Ohio. The drills can be equipped with 3/16, ¼ or 5/16 in. Jacobs chucks. Model 109, illustrated and Model 1010 operate at 2500 r.p.m. Models 1013 and 1014 operate at 4000 r.p.m. for aircraft work and such jobs that require high speed and sustained torque. Features of the drill include, built-in oilers, 4-bladed rotors, hardened and ground cylinders and four ball bearings.



### Clamping Jig

A CLAMPING jig, the Cone-Lok, has been developed by *N. A. Woodworth Co.*, Ferndale, Mich. The jig has a minimum of wearing parts, can be quickly assembled or disassembled and can be converted from right to left hand operation in 2 min., using no additional parts. All moving parts operate in an oil bath and chips and cutting oils are kept from contact with any of the internal parts. Safety features include no movement of working parts without action of the operating lever, the tray positively clamped at any location in up or down strokes, and a second Cone-Lok thrown into action upon receipt of any sudden weight or pressure applied to the

tray. The jig is manufactured in three styles, the three post, the clamp type and the bridge type.



### Mounted Abrasive Points

A UTILITY kit No. MP21 has been announced by *Abrasive Co., Div. of Simonds Saw and Steel Co.*, Philadelphia 37. The 20 points are mounted on stainless steel mandrels 1½ in. long and ⅛ in. in diameter and may be used on high speed grinders, whether air, electric or flexible shaft type. An Electrolon (silicon carbide) dressing stick is included for dressing and altering wheel shapes for special applications.

### Solid Polishing Wheels

A LINE of solid polishing wheels which are to be marketed under the trade name Norflex has been announced by *Norton Co.*, Worcester, Mass. They are available in three types, cork resinoid, fiber resinoid and resilient rubber. All three types possess a relatively soft and flexible bond

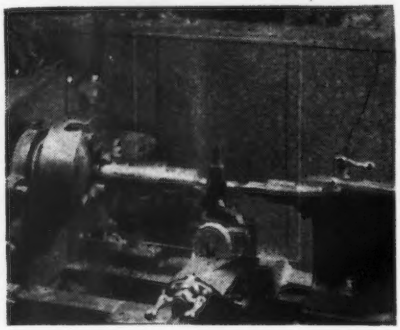
that imparts a cushion-like action assuring a smooth uniform finish. They differ from the conventional grinding wheels in that they are designed to remove only a relatively small amount of material such as a burr or a sharp edge or to polish a surface that is already to size. The fiber resinoid type consists of uniformly sized abrasive grains mixed with cotton fibers and held together with a resinoid bond. The rubber wheels are made of a comparatively soft rubber bond. The cork resinoid type are made up of an abrasive, a resinoid bond and a finely divided cork.

### Copper Diamond Dressers

SOLID copper diamond dressing tools have been announced by *Cleveland Industrial Tool Corp.*, 4713 Euclid Avenue, Cleveland. The tools feature diamonds set in solid copper shanks as well as solid copper matrices. Because of the superior heat conducting quality of solid copper, the tools are said to throw off the effects of great heat rapidly. The copper is also said to clamp the diamond more firmly in the setting.

### Transparent Chip Shield

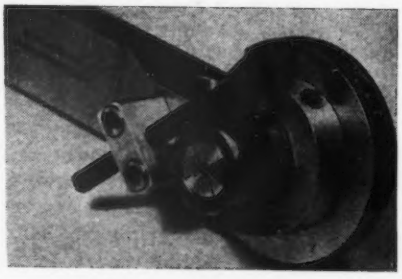
A SAFETY device designed to eliminate the need of goggles and face shields in many machine tool operations has been announced by *Dilley Mfg. Co.*, 10126 Euclid Avenue, Cleveland 6. Known as the magnetic grip-shield, it consists of thick transparent sheets of plastic an-



chored into a horseshoe permanent magnet. The magnet in the base of the shield holds it in position, yet with a slight twist it may be moved to suit operating conditions. It deflects flying chips, metal dust, sparks, oil and liquids to protect machine operators without obstructing vision. Sizes range from 3 x 4 to 8 x 10 in. It also comes in hood type for long time operations.

### Automatic Roll Marker

AN improved automatic roll marker for imprinting serrations, calibration lines, letters, etc., on finished metal parts has been announced by *New Method Steel Stamps, Inc.*, 147 Jos. Campau, Detroit 7. The marker



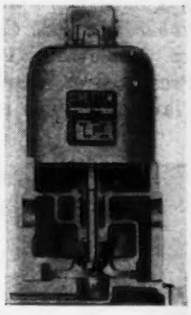
is equipped with a device for adjusting the tension of the automatic spring return for the roll marker. Holders are available with solid type rolls or interchangeable roll markers.

### Diamond Wheel

A DUAL purpose super-cut Zurium bonded diamond wheel, which is two diamond wheels in one, for rough grinding and fine finishing of cutting tools, has been announced by *Industrial Abrasives, Inc.*, 3724 West 38th Street, Chicago 32. Of the two separate grinding surfaces, the outer (7 deg.) beveled surface contains layers of coarse diamonds whereas the inner flat surface is built up of fine diamonds (400 mesh).

### Centrifugal Coolant Pumps

AN improved line of centrifugal pumps including 27 different sizes and types and designated as Logan sure-flow pumps has been announced by *Logansport Machine Co., Inc.*, Logansport, Ind. Although the pumps are designed especially for pumping coolants and cutting oils, they are adaptable especially for circulating cooling liquids, pumping or circulating water or quenching oil and general liquid transfer service. Grinder and submerged types are available. An open impeller



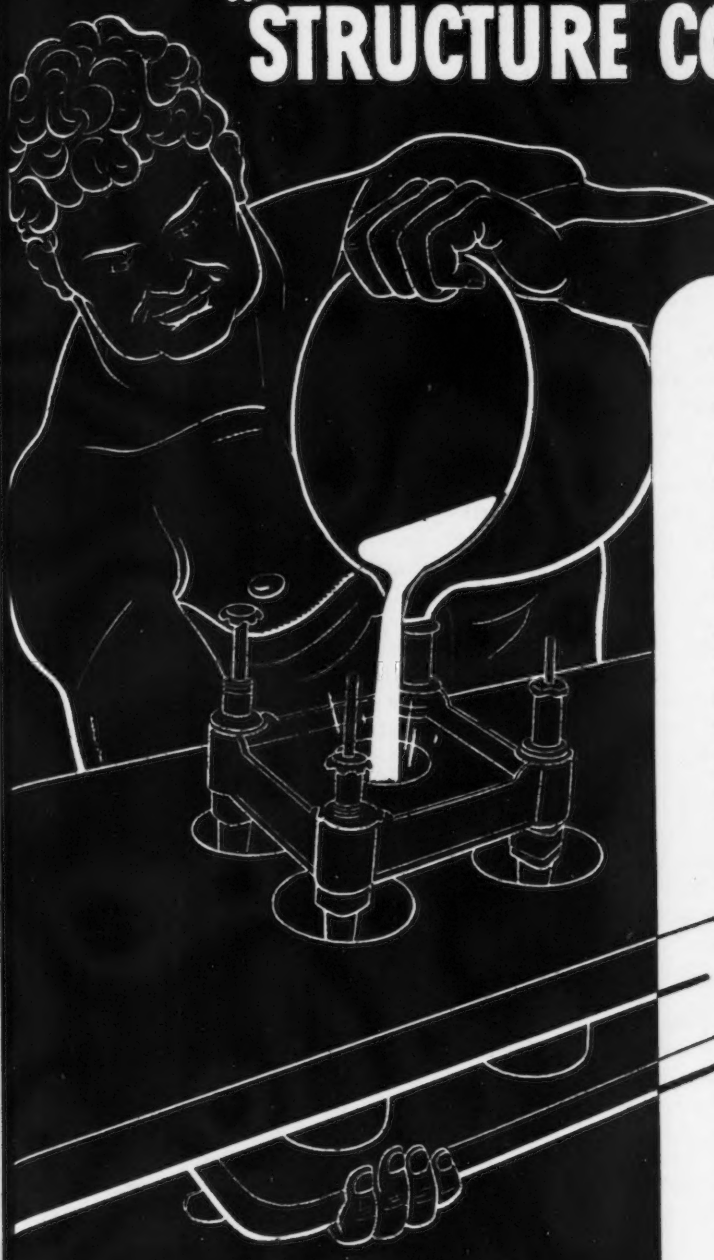
eliminates the need for close clearances or metal-to-metal contact of running parts and allows pumping of liquids containing some abrasives, filings and other foreign matter without damage to the pump. A feature of the base and bracket mounted models is self-priming without submerging.

### Coolant Compounds

TWO coolant compounds, one water soluble, the other soluble in oil have been announced by *Clearlube Products Co.*, 1912 Book Tower, Detroit 26. Because of the absence of free sulphur and fatty acids, these products do not break down, become rancid, or undergo any chemical change regardless of pressure, speed, heat or length of use, it is claimed. They adhere to all surfaces, particularly in the area and at the actual point of contact of the cutting tool with the work. They also provide a rust proofing film.

# "STRUCTURE" CONTROL by OILGEAR

## In Famed Direct Casting Process



## Another Typical Example of the Versatility of this Universal Power Medium

Most successful of all continuous casting methods, on the basis of tonnage produced*, is the famous "Direct Casting" process which "has long been the object of a lively multilateral interest." Here, Oilgear Fluid Power, the versatile method of applying and transmitting power, is used . . . not only to tilt the pouring ladle and to move the hydraulic lowering table, but to provide the crucial control of lowering speed which in part determines the metallurgical structure of the alloy being cast.

The success here of Oilgear Fluid Power—used in almost *every* Direct Casting machine in the country—is another typical example of the fact Oilgear Fluid Power can be used in limitless ways and to solve an endless variety of power and transmission problems. Regardless of what your machine or process power problem is, you should investigate Oilgear Fluid Power . . . now, while there is still time for such preliminary work. Why don't you outline your needs to Oilgear engineers . . . today? THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee 4, Wisconsin.

*The Iron Age, February 24, 1944, pages 56 to 65.

OILGEAR

*Type of Oilgear Fluid Power equipment used not only to tilt pouring ladle in Direct Casting Process but to lower hydraulic table below molds at rate of speed required to produce the proper rate of ingot cooling, hence, metallurgical structure . . . a dramatic example of the unique speed control Oilgear affords.*

### ARE YOU TRYING TO:

1. Apply large forces through long . . . or short . . . strokes at variable speeds?
2. Obtain automatic work cycles, variable speeds in either direction . . . with or without preset time dwell?
3. Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities?
4. Obtain extremely accurate control of either position or speed of a reciprocating member?
5. Apply accurately variable pressure either static or in motion?
6. Closely synchronize various motions, operations or functions?
7. Apply light . . . or heavy . . . forces at extremely high velocities through either long or short distances of travel?
8. Obtain continuous automatic reversing drives at constant R.P.M. or over a wide range of speed variation?
9. Obtain accurate remote control of speed and direction of rotation, rates of acceleration and/or deceleration?
10. Obtain constant horsepower output through all or part of a speed range?
11. Obtain automatic torque control?
12. Obtain accurately matched speed of various rotating elements?
13. Obtain constant speed output from a variable speed input?
14. Obtain full pre-set automatic control, elimination of problems of shock, vibration, etc.?

*You Need Oilgear!*

Fluid Power

# Assembly Line . . . STANLEY H. BRAMS

**• The Mead Committee studies utilization of manpower in Detroit and impresses onlookers with a complete lack of comprehension of the problem.**

DETROIT—Last Friday the Mead Senatorial Committee charged with learning the facts about war production and manpower utilization came to town. To quote its apologists, it was "investigating." To quote the evident facts, about all it did was to create a measure of uneasiness over labor problems whose legal boundaries are being at least partially determined by lawmakers so grossly ignorant of their subject matter.

Matt Smith of the Mechanics Educational Society of America, an independent union, said dourly that amusement tax should have been charged for entry into the hearing chambers. Smith was wrong. There was too much of sadness in the situation to merit amusement tax. The only humor in the proceedings was the miscasting of the investigating senators. To judge from their interest in posing properly for the newspaper pictures, they should have been Hollywood actors. To judge from their inquiries, they should have been a party of grade schoolers on a plant tour at River Rouge.

The committee evidently came to Detroit with some preconceived notions. One was that there is too much centralized control in Washington. Another was that there is not enough centralized control in Washington. Another was that there has been labor hoarding in Detroit industry. Another was that the presence of idle machines in war plants means, ipso facto, that management is derelict in not turning out war goods with them. Another was that witnesses are inevitably liars.

That last conclusion derived from the attitude of Michigan's junior senator, white maned, front page minded Homer Ferguson, who seems unable to forget that he climbed to the Senate on the ladder of his successful convictions while he headed a graft grand jury in Detroit. Ferguson enjoys the inquisitorial attitude. He likes the blunt approach. He is pleased with the mantle of authority he feels is represented in his Senatorial toga. Indubitably he was and is a shining success as a prosecutor. Being a statesman concerned with labor problems is a different sort of affair, but the mechanics of the transition have thus far eluded him.

THE hearing was supposed to be an approach to labor utilization. Briefs prepared by the Automotive Council for War Production, the CIO United Automobile Workers Union and others were aimed toward that end—serious presentations of the problems as they saw them, and what to do about them. The briefs and their contents were buried in the devious criss-crossing directions of inquiry into which Senator Ferguson led the hapless committee. What began as a philosophic attempt to find a way to a better labor policy—better from the standpoint of the nation—rapidly degenerated into windy and confused dissertions on why a number of laid-off riveters couldn't find work elsewhere at once, and how a government representative on a labor panel took a new job as a management representative, and why a company stopped buying gloves for its forge hammerman, and whether an executive spoke for himself or his company when he talked at a Kiwanis Club luncheon, and whether a management spokesman was representing or misrepresenting the viewpoints of management.

Under those circumstances, the Mead committee hearings in Detroit were futile. There would be no point in them at all were it not for the fact that labor and management both used the occasion to enunciate basic and substantial principles in briefs which may some day come to light in the transcript of the case, even though they were eclipsed at presentation by the futile oratory and the discordant soundings of the testimony. Management in particular is significant, because it constitutes a program for future labor relations, a long term platform which will be pursued through this Congress and those to follow as long as it is necessary.

The burden of the management presentation, made by the Automotive Council, is that basic changes are necessary in three fundamental pieces of labor legislation, the Wagner Act,

OFFICIAL FIRE: *Strikes in war plants in Detroit drew fire from Washington officialdom as Under-Secretary of War Robert Patterson, spoke out on the radio on the same program with heroes of the 101st airborne infantry division, made famous at Bastogne.*

# *No wonder your dies are tops..*

## YOU'RE PRATT & WHITNEY EQUIPPED

No die shop customer can fail to be impressed when he sees Pratt & Whitney machine tools at work on precision equipment he is buying. He knows that he can expect just that much better quality and accuracy . . . two things he vitally needs as he lays his plans . . . for now and the future.

Remember this when you place your orders for tools, jigs, dies, fixtures and other equipment that you need now . . . or later when you swing back into civilian production.

*Accuracy breeds accuracy* . . . that's why Pratt & Whitney has earned such an enviable reputation among tool and die shops who pride themselves on turning out the finest quality work. For 85 years, the Pratt & Whitney standards have never changed. Keep an eye peeled for the Pratt & Whitney name on machine tools, small tools, and gages in the shops you pick to make your tools. It will pay dividends.

Working swiftly and accurately, this P&W Die Sinker not only lowers the costs of die sinking operations, but leaves such an excellent finish that hand work in every way is very much less. Ask us to tell you about P&W die making equipment . . . machines, cutting tools, and Kellerflex Flexible Shaft equipment for finishing and polishing.

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the Smith-Connally Act, and the Fair Employment Practices Act. These are the planks of the platform, lying mainly within the fabric of legislation and overlapping slightly into collective bargaining under that legislation:

1. Management should retain, or have restored to it, the ability to manage, and clear definition should be made on which employees represent management and which represent workers.

2. Workers should be protected from management and union coercion, and court review should be provided for administrative actions which might constitute coercion by them or by the government.

3. Penalties should be imposed on any union which strikes before it has exhausted the grievance procedure provided in its contract and in governmental procedures; in such cases it should forfeit the right for a specified time for governmental consideration of its demands.

4. Localized handling of labor union-management problems should be instituted, reversing the tendency toward centralized administration.

5. Directly applied union-management relations should be similarly decentralized, removing from an international union the right to direct and control the collective bargaining of employes of separate employers. Responsibilities for collective bargaining should be lodged in a union exclusively representing the employees of a single employer.

6. Separate unions should have the same protection against undue centralization of power in the international unions as individual companies have in relation to their inter-industry and intra-industry trade organizations.

7. Incentive pay systems should be encouraged where feasible, and particularly where they would increase war production.

8. Unions themselves should pay union stewards or committeemen or other union officials for the time spent on union business.

THE UAW program did not attempt to draft a national labor policy of this sort; it concerned itself simply with rather a generalized series of objectives which were said to provide an answer to the question of how to utilize manpower better today in the auto industry. There is no long term significance of any consequence in them, but they have a measure of merit as near term objectives, although some of them appear to be based on fallacious reasoning. These are the five UAW points:

1. More women should be used in industry; employer opposition to female help must be broken down.

2. A system of voluntary interplant transfers must be instituted, so workers could produce at their fullest skills.

3. A "genuine checkup" of labor utilization in critical plants must be instituted.

4. Wage adjustments must be made in certain instances—particularly in foundries and common labor jobs—to meet critical manpower situations.

5. Plant operations must be improved; increasing efficiency will relieve many labor shortages.

In the eight management points and the five union points lie an agenda for government to consider, refine and follow. They form a solid and logical point from which to begin to relieve today's problems and tomorrow's as well. If the senators will mull them over and take them back to Washington with an intention to act on them, perhaps the weary, irrelevant and monotonous hours in the Detroit hearing chambers will not have been in vain.

## New Tank in Production In Detroit and Flint Arsenals

*Detroit*

• • • **Production** of a new heavy tank, the T-26, is now under way at the Detroit Tank Arsenal operated by Chrysler and the Fisher Body Tank Arsenal near Flint, it was revealed by Undersecretary of War Robert P. Patterson.

Patterson described the T-26 as "the most powerful tank we have ever built." He said that its wide tracks give it power and flotation in mud, and its 90 mm. gun gives it more firepower than any tank previously built in this country.

Fisher Body reported that the new job was designed, engineered and manufactured by its officials in collaboration with Army Ordnance development engineers of the Office, Chief of Ordnance—Detroit.

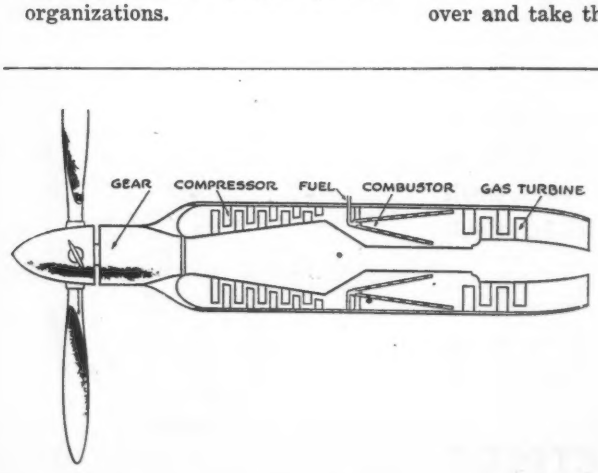
Fisher, it was revealed, has now built more 16,000 tanks and tank destroyers including the M-4 and the M-36 vehicles which paced Allied offensives in the European theater. Chrysler reported that total shipments from its plant now amount to more than 20,000 units, with monthly peak deliveries in excess of 1000, and stated that the company now has 15,000 employees and 3,000,000 sq. ft. of floor space devoted to tank engineering and manufacturing.

The T-26 is powered by an improved model of the Ford V-8 tank engine which develops 500 hp. A Ford statement said that the 43-ton General Pershing tank power plant is even more compact than its predecessors, nearly 20,000 of which have been built for the armed services.

## Ford Loses War Contract

*Detroit*

• • • **Amidst all the many war contracts** placed in Detroit, the Army Air Forces cancelled one of the largest—a quantity order for big Pratt & Whitney aircraft of an advance type at Ford Motor Co. The present Ford Aircraft engine commitment will carry the corporation for many months.




**POSTWAR AVIATION:** *Some arrangement similar to this artist's sketch, using a combination propeller for low altitude efficiency and gas turbine jet for high altitudes, is predicted by most aviation experts for the postwar world.*

# How These 5 Tool Steel Developments Help You Cut Costs & Boost Output Per Tool . . .

ONLY SOUND, CLEAN STEEL CAN PASS THIS TEST

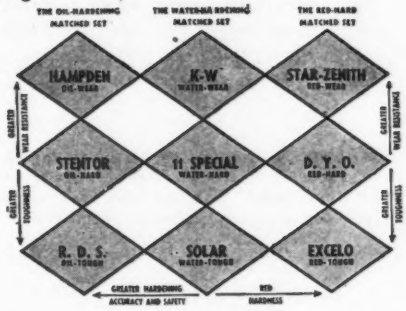
**1.** Insurance that Matched Tool Steels are internally sound lot after lot is provided by Carpenter's Acid Disc Inspection, standard practice for over 15 years.

BOTH BRINE QUENCHED AT 1550° F.

**2.** To assure a wider safe hardening range, greater dependability in performance, Carpenter introduced the Tough Timbre Test in 1930.

TORSION IMPACT TEST SPECIMEN

**3.** More complete heat treating information that leads to better tools has resulted from the Torsion Impact Test, developed by Carpenter more than 10 years ago.




**4.** The Carpenter Matched Set Method of selecting the proper tool steel for each job has been used in thousands of tool rooms since 1935. It's a sure-fire way to cut unit costs with tools that stay on the job longer.

CONE TEST SPECIMEN

**5.** To check and control the hardenability of water-hardening Matched Tool Steels, Carpenter has recently developed a special Cone Test. This test assures that bars of the same size will have uniform hardness penetration in shipment after shipment.

## All 5 WITH CARPENTER MATCHED TOOL STEELS GIVE YOU REDUCED COSTS AND BETTER TOOLS!

Tool makers who use the Carpenter Matched Set Method of selecting tool steel, cash in on the advantages provided by each of these developments. With Carpenter Matched Tool Steels you are sure of—

- **Uniformity from lot to lot**
- **Improved heat treating results**
- **Easier selection of tool steel for each job**
- **Faster tooling-up**
- **Reduced machine shut-down time**
- **Lower production costs**
- **Fewer rejects**
- **Increased plant output**

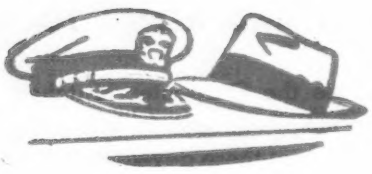
And these advantages are *yours* when you put the Matched Set Method to work in your tool room. To find out more about this method and what it can do for you, just drop us a note on your company letterhead. We will be glad to give you a copy of the 167-page *Matched Tool Steel* Manual. It contains an 80-page Tool Index and Steel Selector, plus useful heat treating information that will be of special value to men responsible for tooling and tool production. This Manual is offered free to tool steel users in the U. S. A.

**The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.**

**Carpenter MATCHED TOOL STEELS**

# Washington . . . L. W. MOFFETT

**• Chances are good for NLRB to reverse its previous position on the question of foremen being part of management . . . Post-V-E Day supply program for the Army delayed.**



WASHINGTON — Chances are very good for the National Labor Relations Board to reverse its previous position on the question of foremen being a part of management when it is expected to decide in the next two months that the Packard Motor Co. must recognize the right of the Foremen's Association of America as the collective bargaining agent of all Packard foremen.

This was indicated by the union slant in the questions of Board member John Huston. The NLRB has three members and Chairman Howard Millis has consistently voted to recognize foremen as a part of labor.

Industry spokesmen who attended the recent hearing said that the case will be taken to the courts on the ground that Packard's constitutional rights will have been violated because of the fact that the requirements of due process under the Fifth Amendment were not met in the hearing because of Board member Huston's unfair attitude.

Attorneys for Packard were Louis Dahling and Patrick Donovan. Other companies represented at the hearing were: General Motors, Bayard D. Kunkle; Chrysler, F. R. Iserman; Murray Corp., R. P. Gould. Walter Nelson was counsel for FAA.

Not only will Packard take the case to the Supreme Court if necessary in case the Board's decision is adverse to the company but industry representatives told the Board that if it decided that foremen were not a part of management, management would have to appoint new supervisory employees to perform the function foremen have historically performed.

Typical questions asked industry representatives by Board member Huston which they felt showed bias were: "Are foremen considered a part of management to the extent that they participate in bonuses? Do foremen have anything to do with company policy?"

Naturally there are many employees on the management side who do not receive bonuses and it is well known that foremen do not formulate major policies of companies. On this ground then, it appears that the questions showed bias.

Huston constantly reminded FAA Counsel Nelson of things he should say, or had said to bolster his case and once implied that the Packard Co. was under the influence of some larger company in the automobile industry because negotiations were once dropped which looked toward approval of FAA. Huston asked if it could be possible that Packard was operating under someone's shadow because it changed its mind about recognizing FAA.

Nelson argued that foremen should not be considered a part of management because they had no longer the right to hire and fire and followed established rules in performing what the company alleged were management functions. Attorneys for Packard pointed out that foremen were historically a part of management.

Argument was raised that if FAA was certified as collective bargaining agent it would then affiliate with CIO. This Nelson denied and Huston asked company representatives if they received assurances that the affiliation would not be consummated upon recognition if they would recognize FAA.

Company representatives did not feel that such assurances would be fulfilled and declared that the time in organizing foremen into the union would undoubtedly detract from war production. Huston and Millis indicated that they did not agree with this industry viewpoint and called attention to the fact that war production has reached unprecedented heights with a high degree of unionization.

Iserman took exception to this opinion and pointed out that in general work stoppages became more frequent after union recognition and specifically noted the case of the Ford Motor Co. which had recognized FAA and has had foremen strikes which they never had before. These strikes disrupted production.

Management's principal point was

VINSON'S SUCCESSOR: *William H. Davis, left, who recently was named Director of Economic Stabilization to succeed Fred M. Vinson, is shown with George W. Taylor, who will take over Davis' post as chairman of the War Labor Board. Until recently Taylor was vice-chairman of the WLB.*

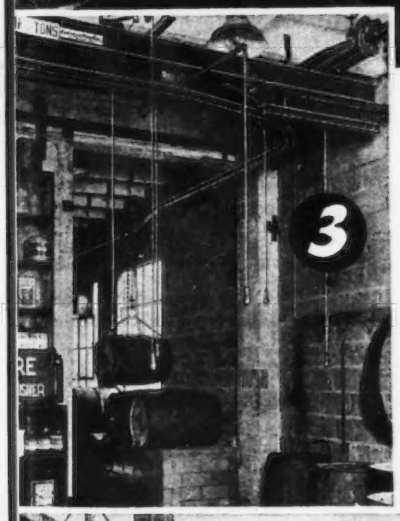
# $1140.

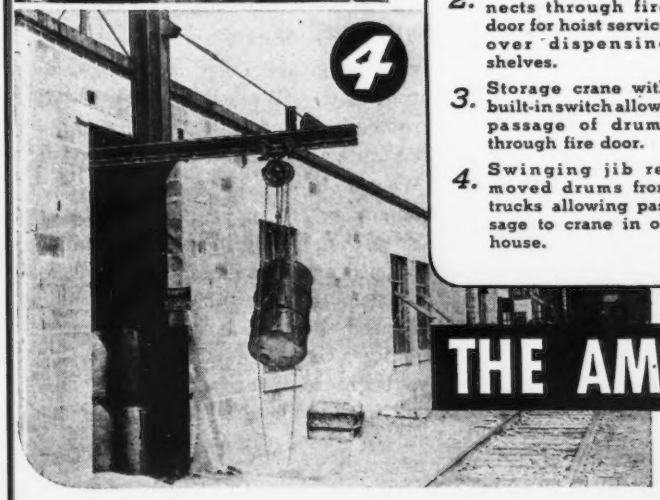
# AMERICAN MONORAIL SYSTEM INSURES

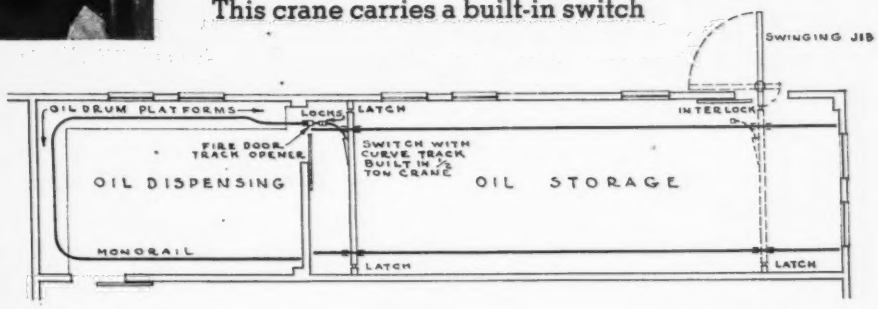
## FIRE PROTECTION • LOW COST HANDLING • ORDERLY STORAGE

All handling of oil drums through storage and dispensing is done systematically at greatly reduced cost.

This installation represents only a small investment. At a cost of only $1140 the system includes a standard jib crane which interlocks with a special bridge crane inside the oil house. This crane carries a built-in switch permitting passage of hoist to a curve connecting through the fire door to the single track loop of MonoRail around the dispensing room.




1. Special crane carries drums across switch to track in dispensing room.
2. Loop of track connects through fire door for hoist service over dispensing shelves.
3. Storage crane with built-in switch allows passage of drums through fire door.
4. Swinging jib removed drums from trucks allowing passage to crane in oil house.

Here is another example of a low price system furnishing low cost operation of American MonoRail equipment. Let an American MonoRail engineer show you the answer to your troublesome handling problems at no cost to you.

**THE AMERICAN MONORAIL CO.**

13103 ATHENS AVE. • CLEVELAND 7, OHIO

that if foremen formed into unions they could not be expected to be loyal to the interests of management and of the union at the same time. Furthermore, for example, foremen could not be depended upon to be responsible for production when faced by worker demands for featherbed rules and slowdowns, if they had conflicting union interests.

The automobile industry which has had a reputation for standing up for its rights more than most heavy industries can be expected to make a stiff fight over this issue and carry its story to the public and to Congress as well as taking it to the courts.

The apparent new stand of the NLRB will be bound to have repercussions throughout industry and the situation has not been helped generally by management because authority has been taken from foremen and transferred to shop stewards or to other staff functions. This is the belief of quite a few industrial relations advisers, who say that the power of the shop steward to assist in the settlement of grievances should be given back to foremen.

* * *

**The Mead Committee** will soon issue a report on surplus property disposition and in addition within the next six weeks expects to issue its year-end report which will contain all previously issued reports and in addition several new ones.

* * *

**The post-V-E Day supply program** of the Army was due at WPB on March 6, but for some unaccountable reason was delayed. Rumor was that the cutback from present production levels would only be about 10 per cent and considerable opposition has developed against so small a cutback. The opposition is below the organization level of WPB Chairman Krug and his vice-chairmen. The opposition wants a minimum of 30 per cent cutback.

**Senator Joseph C. O'Mahoney,** Democrat of Wyoming is drawing up a report upon the disposition of government-owned steel plants to be issued by the Senate Small Business Committee in about 60 days. The report reverses the usual Senate process, because hearings will be held on the basis of the report instead of vice-versa.

## *Reports Willow Creek Bed Good Source For Coking Coal Supplies*

***Washington***

• • • **A reserve of 15,345,000** tons of coking coal in the Kemmerer district of Lincoln County, Wyoming, has been proved by a Bureau of Mines diamond drilling program, which was undertaken to provide additional sources of fuel for the West's blast furnaces, according to Bureau Director R. R. Sayers. He said in commenting on a published project report, that an estimated 11,215,000 tons of this coal in the Willow Creek bed are considered recoverable. The report was prepared by Albert L. Toenges, J. D. Davis, Louis A. Turnbull and J. M. Schopf of the Bureau and is known as Technical Paper 673, "Reserves, Bed Characteristics and Coking Properties of the Willow Creek Coal Bed, Kemmerer District, Lincoln County, Wyo." Copies may be obtained for 25c. from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Carbonization tests on the Willow Creek coal at the Bureau's laboratories in Pittsburgh, the report said, disclosed that coke made from this fuel—a high-volatile A bituminous—was somewhat weaker than that produced from Utah's Sunnyside coal. However, a blend of equal parts of the two coals yielded a coke that met the standards of the Columbia Steel Co., it was pointed out. Coking properties can be improved by cleaning, indicating that the mine-run coal should be prepared in a mechanical cleaning plant because partings in the bed cannot be removed effectively by hand, the publication said.

On government-owned land, the bed considered minable—known as the Middle Main bed of the Willow Creek group—averages 54 in. in thickness and underlies 1710 acres of surface in three areas near Kemmerer.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

OH, ED! HERE HE IS--I'VE FOUND HIM!
I DON'T SEE WHAT GOOD IT IS FER TH' CHIEF TO HAVE A STAFF, IF HE CAN'T VISIT AN OL' CRONY FER A FEW MINUTES WITHOUT BEIN' HUNTED DOWN LIKE A PACK OF HOUNDS AFTER A FOX!
WELL, HE NEVER TRAINED TH' PACK-- HE'S CARRIED MOST OF TH' STUFF IN HIS OWN HEAD FER SO MANY YEARS THAT TH' PACK STILL DON'T KNOW IF HE WANTS 'EM TO HUNT FOX ER RABBITS!
THE RUNNING MATES
3-16
J.R.WILLIAMS
COPR. 1945 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

## "Weasel" Schedules Raised

*South Bend, Ind.*

• • • **Studebaker Corp.** will increase output of the "Weasel" personnel and cargo carrier and of heavy-duty military trucks starting April 1.

Weasel output will be advanced approximately 50 per cent to help take care of the sharply increased demand developed as a result of the vehicle's operation in both the Pacific and European theaters. It was announced recently that Ford Motor Co. will also begin to manufacture this job. Studebaker will deliver engines to Ford to power the latter company's production.

## PRECISION INSPECTION AND MANUFACTURING

The Sheffield Corporation has provided industry with a broad line of precision gages and instruments for the dimensional control of manufactured mechanical parts of all kinds. These include the Visual Gage, Precisionaire, Multichek, Electrigage, Electrichek, Internal and External Measuring Instrument, Thread Checking Instruments and Automatic Gaging Machines. Only a few of these are illustrated here.

## FOR THE MANUFACTURE OF PRECISION THREADS AND FORMS

The Micro-Form Grinder provides the most economical method of grinding both flat and circular form tools from carbides and steels. Precision forms and threads are most accurately produced in a shorter time, often by plunge grinding, on the Precision Thread and Form Grinder with a crusher dressed multi-ribbed wheel. These machines can also be used in making crusher rolls for dressing surface grinder wheels.

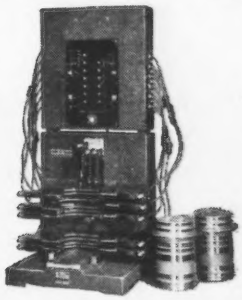
## SHEFFIELD CONTRACT SERVICES

As one of a very few American manufacturers producing both machine tools and precision inspection equipment, Sheffield is excellently prepared to coordinate both quantity and quality production. In this connection, Sheffield serves many manufacturers on tooling programs and maintains a large staff of expert tool engineers. Sheffield offers the combined services of both the tool engineering department and the manufacturing department or either individually.

Contract production for other manufacturers include also precision threaded parts, form tools of all kinds, sub-assemblies and complete assemblies.

*WRITE FOR ENGINEERING DATA*

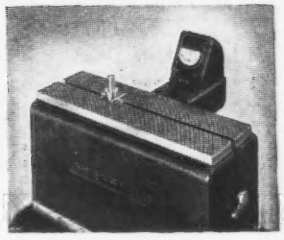
*VISUAL GAGE, available in six amplifications, for checking external dimensions both in process and final inspection. Angularity of surfaces, angularity between a surface and a bore, surface run-out, pitch diameter of screw threads, internal dimensions, and other critical conditions can be checked with the use of standard and special accessories.*



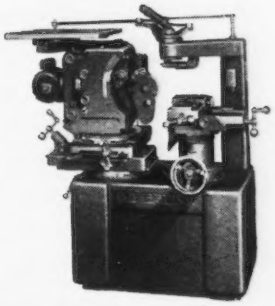
*SHEFFIELD MULTICHEKS inspect from 2 to 20 and more dimensions (both upper and lower limit) simultaneously in one operation. Savings in time, floor space, inspection and production costs normally offset the cost of a Multichek in from 6 to 12 weeks.*

*THE PRECISIONAIRE is a flow-type air gage for measuring internal and external dimensions, bell mouth, out-of-round and average diameters of through, blind and step holes. It checks both GO and NOT GO limits in one pass very much faster and with 10 to 40 times less gage wear than can be done with fixed size gages. The human element of error does not enter.*

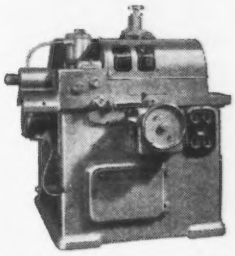
*THE SHEFFIELD INTERNAL - EXTERNAL MEASURING INSTRUMENT with Electrigage.*



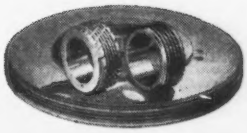
*TYPE C AIRSNAP for checking external dimensions.*



*THE SHEFFIELD MICRO-FORM GRINDER grinds any flat or circular form tool, profile work or wheel crusher rolls to an accuracy of .0003" directly from a 50 to 1 layout drawing—no template required. It saves up to 75% in machine time over conventional methods, especially on carbides.*



*This is the SHEFFIELD PRECISION THREAD AND FORM GRINDER using the amazing crusher roll method of dressing a multi-ribbed wheel for the production of threads or forms by either plunge or traverse grinding. Can also be used as a conventional single point grinder.*



*Multi-ribbed wheel, crusher roll and work part.*

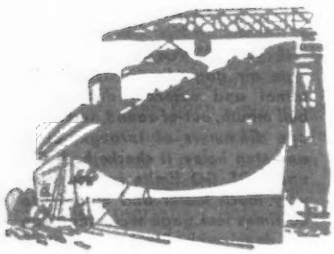
# THE SHEFFIELD CORPORATION

*Dayton 1, Ohio, U. S. A.*

MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICES

# WEST COAST . . . OSGOOD MURDOCK

**• Senators start picking favorites on what may become a scramble for Geneva plant, now that C F & I has spoken for a place in line . . . Food Machinery will be a postwar leader with present backlog of $200,000,000.**



SALT LAKE CITY—Senator Abe Murdock of Utah has publicly expressed himself as enthusiastically approving the sale of the Geneva plant to the U. S. Steel Corp. after the war. "It seems only logical to me that by reason of their long operation in Utah and their complete knowledge of all factors in the broad aspects of the steel industry, the U. S. Steel Corp. would have a decided advantage over any other company moving in there," the Senator points out. He states he has conferred with representatives of the corporation and has been assured that in case of purchase it would be the policy not to close the plant down but to operate it at as full capacity as the peacetime demands of the West Coast justify.

Senator Owen Brewster of Maine, ranking Republican member of the Mead Committee (Senate Committee to Investigate the National Defense) when he addressed the recent Western States Council here declared "this administration is no more ready to meet these problems of peace than it was ready to meet the problem of total war at the time of Pearl Harbor . . . No serious and responsible voice is heard these days which advocates government ownership and operation of such establishments as these steel plants. Everyone seems agreed that our surplus plants must be sold to private industry as rapidly after the war as possible . . . Our ultimate goal is the full use of our human and material resources."

To implement and effectuate this business-like disposal of war plants to the legitimate bidder with greatest promise for operating them practically and economically postwar, Senator Brewster proposes a single round table council at Washington set up by the Defense Plant Corp. with its own representative as chairman. Others on the council should be a representative from the Attorney-General, a steel man from the War Production Board and representatives from the Senate, the House, from industry, from labor and from communities affected. If and when proposed terms of sale are cleared by such a council or committee, the Senator suggests that the executive and legislative branches of government should proceed promptly and avoid frustration of business initiative through governmental indecision.

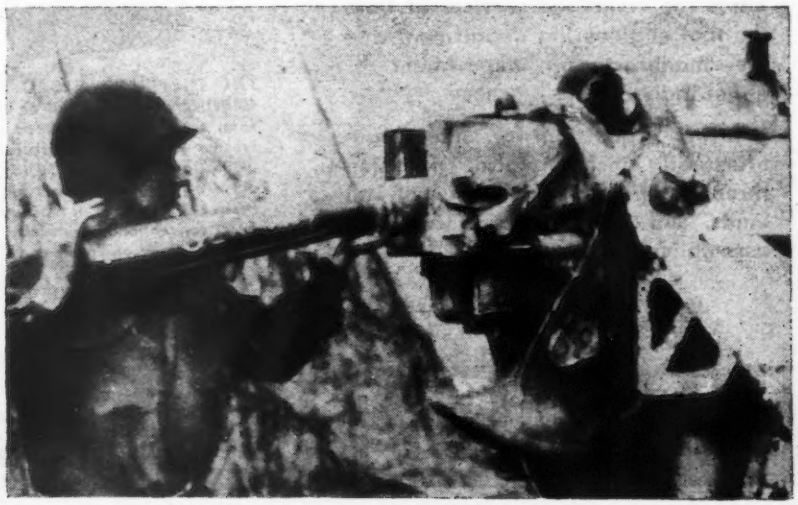
COLORADO FUEL & IRON CO., Pueblo, and Denver, spoke for a place in the line of prospective bidders for the Geneva plant earlier this month when President W. A. Maxwell, Jr. addressed DPC Chief Sam H. Husbands at Washington: "We would be interested in conferring with you or your representatives with a view to actively carrying on the operation of this plant . . . this corporation has been manufacturing steel for well over 50 years, is thoroughly conversant with the raw materials situation including iron or coal, etc. and owns and operates large deposits in Utah, Colorado and Wyoming . . . an intimate knowledge of the requirements . . . an established, well informed and seasoned sales and distribution force . . . plans . . . research sales work on additional products."

Mr. Husbands pointed out that both C F & I and U. S. Steel are willing to make any necessary plant reconversion at their own expense and he told Congressman J. Will Robinson of Utah that it would be preferable to deal with some operator who would assume that burden. Charles Allen, Jr. of New York, controlling Wickwire Spencer Steel Co. has recently acquired controlling interest in C F & I.

Geneva Steel Co. showed a gross operating profit of over $900,000 for January, DPC proudly reports, but independent of taxes, depreciation and some other fiscal charges encumbent upon private industry.

Geneva's labor and industrial relations situation has been unusually favorable. An NLRB election last August lead to horizontal organization of all plant employees under AFL and a contract was entered into Nov. 22 without closed shop or union security provisions. Two weeks ago a tripartite hearing at Salt Lake under WLB auspices received an AFL compromise proposal in which new employees would not be required to join the union but status quo would be maintained among men already at

TABLES ARE TURNED: *U. S. soldier loads a captured German 88 mm. gun with a shell to fire on enemy positions across the Rhine, in the Strasbourg, France, area. The gun and ammunition were captured when the Germans were driven from Offendorf, France.*

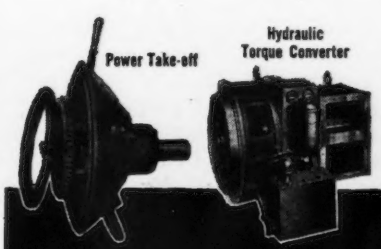


# HE PLAYS IT *Safe*

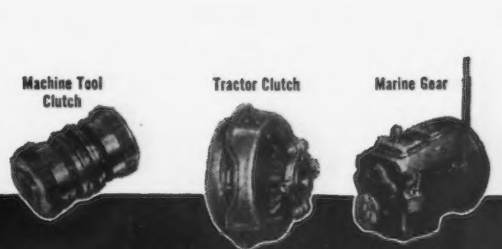
In his line—with the responsibility for life, limb and property weighing heavily on his shoulders—there's only one way to play it ...and that's to play it safe!

With Twin Disc, *playing it safe*...making sure that the product is designed and built right, properly applied and serviced...has been a cardinal point of company policy for more than 26 years. Year after year, the wisdom of this policy has been demonstrated by the ever-increasing list of powered industrial equipment in which Twin Disc Clutches and Hydraulic Drives provide the connecting link between driving and driven units.

If you build or operate machinery involving a problem of power transmission and control . . . *play safe* by asking Twin Disc engineers for their recommendations. Whether the solution of your problem lies in friction clutches or hydraulic drives, it's all the same to them because Twin Disc builds both. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).




TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U.S. PAT. OFF.




SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

work. AFL also wants a 30c. an hr. wage increase with 10 per cent for swing shift and 20 per cent for graveyard shift premium, two weeks severance pay for each year of employment and disability for sickness or injury even if not job caused.

* * *

SAN FRANCISCO — Food Machinery Corp.'s new ordnance contracts, bringing its backlog orders up to 200 millions, put postwar planning further into the future, but the company's 14 plants, scattered from California to Ohio, Texas and Florida, are making records which indicate their important position in the machinery industry.

FMC is one of the principal manufacturers of amphibious vehicles. Their staff of 40 engineers have been kept continuously busy engineering the Navy's "Water Buffalo" for themselves and for Graham-Paige, Borg Warner and St. Louis Car. In addition to chemical and other ordnance contracts the company has also perfected a high pressure fire fighter. Pumping and spray equipment is mounted on a standard truck chassis, developing 800 lb. pressure. The spray extinguishes fire in a matter of minutes without water damage. The company anticipates wide sales for the equipment in both rural and urban areas for fire protection. Adapted to agricultural dusting and fog spraying it eliminates the labor cost of manual spraying.

Foundation of the company's business is the Anderson Barngrover subsidiary's sterilizer which processes 70 per cent of the nation's evaporated milk, and their packing house food processing equipment for the preservation of citrus and deciduous products.

Operating this decentralized organization, Paul Davies, president, says that he finds very little difference in operating costs between any of his plants. Each area has offsetting advantages and disadvantages. "If anybody says it costs less to manufacture in California because of weather conditions, they're kidding," he declares. In possible confirmation of this point, the company plans to move its citrus manufacturing operation to Florida at war's end.

* * *

KAISER STEEL at Fontana has contracted to supply several thousand tons of four-inch round-cornered square shell-steel billets to the Rheem Mfg. Co. at Las Vegas for its Army Ordnance contract for 105 mm. shells. Fontana will also supply 3½-in. round-cornered squares to the Remeco-Denver division of Kaiser Industries on its 90 mm. shell contract.

Last week another record was broken at Fontana in a single day's production on the 155 mm: forged shell line. Forging billets from the Fontana structural mill are forged, pierced, nosed and rough machined before shipping to Remeco-Denver for the finished machining and loading.

* * *

**Production Engineering Corp.**, Oakland, one of the affiliate interests of Charles E. Moore of Joshua Hendy, has been sold to Goldfield Consolidated Mines Co., one of the properties in which ex-Governor George Wingfield of Nevada is active. Production Engineering has made bands for shells and 10-ton heavy-duty dollies. Goldfield Consolidated also recently acquired a substantial interest in Dalmo Victor Inc., which turns out magnesium bomb castings and electronic products, with headquarters at San Carlos, Calif. Goldfield Consolidated has been producing aluminum powder at its plant at Southgate Calif. and fine mesh magnesium powder at South San Francisco.

* * *

**What is said to be the first maintenance of membership clause for any Chrysler plant in the United States** was recently won by United Auto Workers at the San Leandro, California, Chrysler plant in a WLB decision last month. The decision was handed down by the 11th regional WLB in Detroit, having been transferred under union protest from the 10th regional WLB in San Francisco.

* * *

**Marinship Corp.** at Sausalito, Calif., has switched its Maritime Commission contracts to a competitive fixed price basis from the hitherto conventional cost plus fee arrangement. President K. K. Bechtel hopes and aims thus to compete with eastern and Gulf yards for postwar ship construction contracts. The new contracts cover not only all ships to be built by Marinship during 1945 but also 19 tankers delivered since Sept. 6, 1944.

In its primary emphasis on cost and cost reduction, Marinship is asking its workers to cooperate in the attempt to hold some 12,000 jobs permanently. Day shift operation has been instituted for the vast majority of personnel, with minimum overtime, maximum use of daylight and a reduction of total workers to minimize absenteeism, tardiness, willful neglect and inefficiency.

## Cited for Awards

• • • **The following companies have received Army-Navy "E" awards for outstanding war production:**

**Vendo Co., Aircraft Products Division, Kansas City. (fifth star)**
**General Excavator Co., Marion, Ohio.**
**E. T. Fraim Lock Co., Lancaster, Pa.**
**Black & Decker Mfg. Co., Towson, Md. (third star)**
**Continental Can Co., Inc., Clearing Ordnance plant, Chicago. (first star)**
**American Steel & Wire Co., Duluth, Minn.**
**Bishop & Babcock Mfg. Co., Plants No. 1 and No. 2, Cleveland.**
**C. Albert Carlson, Minneapolis.**
**Shops of Edward A. Brass, Shreveport, La.**
**Chandler-Evans Corp., South Meriden, Conn.**
**Crane & MacMahon, Inc., St. Marys, Ohio.**
**Dobeckmun Co., Cleveland.**
**Litchfield Mfg. Co., Litchfield, Mich.**
**Moore & Kling, Boston.**
**North & Judd Mfg. Co., New Britain, Conn.**
**Ohio Crankshaft Co. and Ohio Crankshaft, Inc., Cleveland.**
**Quincy Elevator Gate Co., Tiffin, Ohio.**
**Regent Shops, New York.**
**Reliance Mfg. Co., Hattiesburg, Miss.**
**Saginaw Body Mfg. Co., Saginaw, Mich.**
**Superior Coach Corp., Lima, Ohio.**
**U. S. Plywood Corp., Algoma, Wis., and New Rochelle, N. Y.**
**U. S. Rubber Co., Passaic, N. J.**
**Warwick Mfg. Corp., Chicago.**

## Shipyard Layoffs Involve Migration

***Washington***

• • • **The exodus of** 50,000 to 65,000 shipyard workers to Eastern production centers from the Pacific Coast Shipyards soon may become one of the greatest mass movements of population the country has ever witnessed at any one time, if plans of WPB are carried out.

Labor Production Vice-Chairman Joseph B. Keenan told THE IRON AGE on March 9 that it is expected that the push back of merchant ship delivery dates may make this program possible which will have the effect of making a major population adjustment prior to the end of the Japanese war.

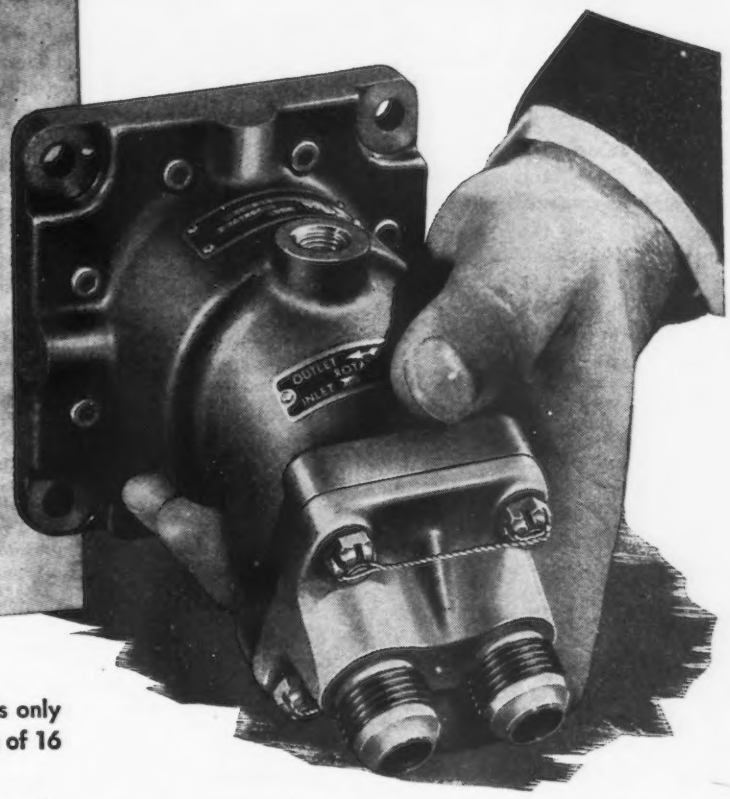
What raises the problem is the fact that the projected shipping program to take up possible lay-offs due to a decline of the present program has not materialized because the European war does not appear to be as lengthy as original estimates. Mr. Keenan said that West Coast yards will be obliged to lay-off approximately 140,000 workers, only half of which it is anticipated will be needed by new merchant and Navy repair programs.

# 2.5 HORSEPOWER PER POUND

## IS THE OUTPUT OF THIS

## VICKERS AIRCRAFT HYDRAULIC MOTOR

(PISTON TYPE CONSTANT DISPLACEMENT)




This Vickers Aircraft Hydraulic Motor weighs only 6.4 pounds yet it has a normal output rating of 16 horsepower at 3000 psi and 3750 rpm.

But a high horsepower/weight ratio is not the only advantage of using Vickers Hydraulic Motors for delivering rotary mechanical motion on many aircraft and industrial applications. These hydraulic motors save space as well as weight. Starting and stalled torque can be higher than operating torque if desired. They can be stopped accurately to position . . . no clutches or brakes are required. They are used for dynamic braking and can be stalled for long periods without damage. These hydraulic motors can be started and stopped instantly due to the very low inertia of the moving parts. They cause no radio interference. Reversal and accurate control of speed are very simply and easily accomplished.

Vickers Piston Type Hydraulic Motors are inherently simple and rugged, with resulting minimum maintenance; they are easy to install and widely adaptable. All of these characteristics suggest many applications to a wide variety of new postwar equipment.

**VICKERS** *Incorporated* • **1420 OAKMAN BLVD.** • **DETROIT 32, MICHIGAN**

*Engineers and Builders of Oil Hydraulic Equipment Since 1921*

# PERSONALS

CAPT. JAMES D. MOONEY, vice-president, General Motors Corp.

• **Capt. James D. Mooney,** recently released from active duty by the Navy, has returned to General Motors Corp., New York, to resume his duties as vice-president, group executive of the overseas operations of the corporation, as a member of the Administration Committee and a member of the board of directors.

• **Walter F. Ardussi** has been elected vice-president of the Hupp Motor Car Corp., Detroit. Mr. Ardussi will direct the company's sales organization and engineering research and development activities at both the Globe Stamping Division and the Hupp Machining Division.

• **Ross Rathbun,** formerly manager of air conditioning, has been appointed manager of the expanded Air Conditioning Division, Westinghouse Electric Elevator Co., Jersey City, N. J.; **Walker G. White,** formerly sales manager, has been named manager of the Elevator Division and **George F. Begoon** has been named manager of the precipitron department of the Air Conditioning Division.

• **J. T. AuWerter** has been elected president and general manager, Cuyahoga Steel & Wire Co., Cleveland.

• **Alfred G. Mohrman,** formerly assistant manager, has been appointed manager of the New York office, Bridgeport Brass Co., Bridgeport, Conn.

• **Wilton O. English** has been appointed manager, Drop Forging Division, The National Lock Washer Co., Newark, N. J.

• **Guy S. Peppiattas,** associated with the Federal-Mogul Corp., Detroit, for 18 years, has been elected executive vice-president in charge of manufacturing and related activities. **Samuel E. MacArthur** has been appointed controller and **William R. Waddell,** assistant secretary.

• **George E. Westerholm** has been appointed to the executive staff of the Peninsular Grinding Wheel Co., Detroit. Mr. Westerholm's duties will be concentrated in the engineering and production divisions of the company.

• **W. E. Coakley,** formerly production manager, Pressed Steel Tank Co., Milwaukee, has been elected vice-president and director.

• **Delos R. Hay** has been elected president and treasurer of the A. T. Wagner Co., Detroit, succeeding the late T. W. Kirby.

• **Max M. Roensch,** former staff engineer of the Chrysler Corp. has been appointed chief engineer of the Cleveland Graphite Bronze Co.

• **M. E. Miller** has been named central sales manager of R. G. LeTourneau, Inc., Peoria, Ill. Mr. Miller joined the firm in 1934 at its Stockton, California, office. Since 1940 he served as a district representative in the south and southwestern states, the position he held prior to his recent appointment.

M. E. MILLER, central sales manager, R. G. LeTourneau, Inc.

CARL C. GOBDEL, manager, Special Steels Department, Philadelphia plant, Joseph T. Ryerson & Son, Inc.

• **Carl C. Gobdel** has been appointed manager of the Special Steels Department at the Philadelphia plant of Joseph T. Ryerson & Son, Inc., Chicago. Mr. Gobdel joined Ryerson in 1936, serving in the special steels division at both the Chicago and then the St. Louis plants. Prior to his recent appointment he held the position of sales representative in Missouri.

• **Carl F. Oechsle,** affiliated with the Worthington Pump & Machinery Corp., Wellsville, N. Y., since 1931, has been appointed assistant vice-president and manager of the Construction Equipment Division, with headquarters at Holyoke, Mass.

• **Leonard C. Crewe, Jr.,** has been made works manager of the Johnson Steel & Wire Co., Inc., Worcester. Mr. Crewe formerly was associated with the LaFollette Coal & Iron Co. and the Bethlehem Steel Co.

• **George R. Carr** has been elected chairman of the board, Dearborn Chemical Co., Chicago, to succeed the late Robert F. Carr.

• **Don E. Miller,** formerly factory manager of the Garfield Division, Houdaille-Hershey Corp., has been appointed executive assistant to John J. Prindiville, Jr., vice-president and works manager of The Lapointe Machine Tool Co., Hudson, Mass.

• **William R. Hill** has been appointed general sales manager, industrial and commercial sales, Warren Steam Pump Co., Warren, Mass.

"A name worth remembering"

# FAIRBANKS-MORSE

Fairbanks-Morse postwar products will serve you with the *dependability* the world has come to associate with our name. Designing and manufacturing skills will not have to be re-learned in our plants as we turn to civilian production, because as a part of our war job, we've continued to build and improve our peacetime Diesel engines, generators, motors, pumps, and scales.

R. H. Morse Jr.

General Sales Manager

Fairbanks-Morse Pumps are famed for their power-saving efficiency... and for mechanical advantages which cause them to retain that efficiency through long, trouble-free lives. The line is complete—includes centrifugal, split-case centrifugal, built-together, angle-flow, power, rotary, turbine, propeller, paper stock, sewage, trash, and many other types, all in a full range of capacities.

# PUMPS

**FAIRBANKS, MORSE & CO.**
**CHICAGO 5, ILLINOIS**

**Diesel Locomotives • Diesel Engines**
**Scales • Generators • Motors • Pumps**
**Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment**

*BUY MORE WAR BONDS*

FRED J. BECKMANN, superintendent, Saucon Division, Bethlehem Steel Co.

• **Fred J. Beckmann,** formerly assistant superintendent, has been appointed superintendent of the Saucon Division roll shop at the Bethlehem, Pa., plant of Bethlehem Steel Co. **Mr.** Beckmann succeeds the late Harry K. Maxwell.

• **Malcolm E. Morgan** has been appointed superintendent of the blast furnaces and coke works for the southern district, Republic Steel Corp., Cleveland.

• **G. H. Smith** has been appointed vice-president and general manager of the Deepfreeze Division, Motor Products Corp., Detroit. For the past several months Mr. Smith has been associated with the Magnavox Co., as a merchandising counselor. Prior to that time he was general sales manager of the Hotpoint Co., Chicago.

• **Arnold W. Brady,** formerly associated with the Chrysler Corp., has been appointed director of industrial relations for the Michigan and Iowa plants of Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich.

• **T. W. Shook** has been named manager of refractory sales, Basic Refractories, Inc., Cleveland, succeeding the late Huntington Downey. **Thomas P. Stanton,** who recently joined the sales engineering staff of the company, will serve the Philadelphia territory. **J. D. Hysong** has been appointed Chicago district manager and **C. R. Heilig,** district manager for the central districts.

• **Herbert G. Schlegel** has been appointed general sales manager of the National Mfg. Co., Tonawanda, N. Y. Since 1937 Mr. Schlegel has been vice-president in charge of sales of Hays-Taylor, Inc., a subsidiary of National Manufacturing.

R. P. TYLER, general sales manager, Macwhyte Co.

• **R. P. Tyler** has been appointed general sales manager for Macwhyte Co., Kenosha, Wis. Mr. Tyler previously was sales manager for A. Leschen & Sons Rope Co., St. Louis.

• **A. A. Helwig** has been elected president of Standard Railway Equipment Co., with headquarters in Chicago; **D. R. Arnold** has been elected senior vice-president and **R. G. Sonquist,** vice-president at New York and **J. E. Vaughn** has been elected vice-president at Chicago.

## ...OBITUARY...

• **Bertram B. Quillen,** president of the Cincinnati Planer Co., the Acme Machine Tool Co., Cincinnati, and a nationally known authority on machine tools, died suddenly, February 26.

• **James L. Ashley,** a director of the International Nickel Co. of Canada, Ltd., died suddenly March 6. Mr. Ashley was formerly secretary and treasurer of the company and vice-president and treasurer of the International Nickel Co., Inc., the United States subsidiary.

• **Frederick L. Ambach, Jr.,** president of the American Iron-Steel Mfg. Co., Wellston, Mo., died February 16.

• **Ralph Stoddard,** 75, chairman and director, DeLaval Steam Turbine Co., East Trenton, N. J., and president and treasurer of the DeLaval Separator Co., New York, died February 20. Mr. Stoddard was also president of DeLaval Pacific Co., San Francisco, and chairman of DeLaval Co., Ltd., Peterborough, Ontario, Canada.

• **Edgar A. Simmons,** president, Superior Machine Tool Co., Kokomo Nail and Brad Co., Kokomo Spring Co., Kokomo, Ind., died February 22.

• **Andrew C. Perkins,** president of Richmond Foundry & Mfg. Co., Richmond, died recently.

• **Paul Krone,** 69, president, Paul Krone Die Casting Co., Chicago, died February 21.

• **Howard W. Raymond,** president and director of Charles P. Hull, Inc., American representatives of Capper, Pass & Son, Ltd., Bristol, England, died suddenly March 7. Mr. Raymond was 58 years of age.

• **Alfred C. Funk,** 78, retired manager of the Trenton, N. J., plant of the American Bridge Co., Pittsburgh, a U. S. Steel Corp. subsidiary, died February 27.

• **E. J. Miller,** president, St. Louis Screw & Bolt Co., St. Louis, died recently.

• **Lieut. Comm. William Baker,** vice-president of Baker Bros., Inc., Toledo, Ohio, died recently.

• **Benjamin Nields,** assistant vice-president of National Malleable & Steel Castings Co., Cleveland, died February 26.

• **Garth G. Gilpin,** 62, vice-president of manufacturing, Standard Railway Equipment Mfg. Co., died February 25 at Wickenburg, Arizona.

• **Albert E. Robinson,** 79, executive vice-president of the American Tool Works, died recently. Mr. Robinson joined the company 61 years ago. He became vice-president in 1943.

• **Carl M. Beattie,** general manager of Lake City Malleable Co., Cleveland, died February 27. Prior to coming to Cleveland in 1926 Mr. Beattie had been president of Jewell Alloy & Malleable Co., Buffalo, N. Y.

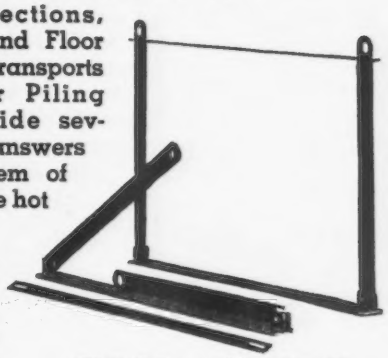
# HOW TO HANDLE HOT STUFF

with the

## TURNER SYSTEM OF MATERIALS HANDLING

Steel Bin Sections, Grid Deck and Floor Plate Deck Transports and Turner Piling Stakes provide several good answers to the problem of how to handle hot materials.

They are units of the complete Turner System which saves 50% labor, space and equipment costs.



Piling Stakes enable systematic piling of hot or cold bar material.

Steel Bin Sections fit on the Turner Transport. Heavy loads of hot materials are easily moved with the Jimmy.

**Double Handling Efficiency in your plant with these and other units in the TURNER SYSTEM.**

The Piling Stakes fit on the Transport for vertical extension of loads.

These Steel Bin Sections may be placed one on top another on the Transport — to any practical height.

The complete story of the Turner System of Materials Handling will open your eyes to many ways of increasing handling efficiency. It is described in a twenty-page book sent free upon written request (on your letterhead.)

The Transport with Floor Plate Deck provides point contact with hot materials and "non-skid" feature.

**Send for your Copy of Free Book on the TURNER SYSTEM.**

The Grid Deck Transport minimizes heat conduction because of well ventilated line contact with hot materials.

# FACTORY SERVICE COMPANY

4621 NORTH TWENTY-FIRST STREET — MILWAUKEE 9, WISCONSIN

# Dear Editor:

## WALLACE HAS A PLAN

Sir:

In reference to your presumptuous editorial, "Trading an Ace for a Two Spot," wherein you criticize the President for rewarding a faithful supporter and then proceed to worship your hero, I have no doubt that Jesse Jones is deserving of every bit of praise you extend him. His record will bear evidence of his loyalty and faithful support of big business. And while you confessed some months back that you did not know what was meant by "Big Business," your feature writers continually refer to "Small Business," so big business must be those who were so faithfully supported by Jesse Jones. At least in order to make use of the thousands of small business enterprises throughout the land, the Small War Plants Administration was set up and the lending agency for these institutions was invested in this authority.

Henry Wallace may be everything your mind can contrive, and of which you are so concerned. But at least he has a postwar plan, and Mr. Jones hasn't. As we watch with interest the maneuvering of the "Main Line of Defense of Big Business Management"—the reactionary members of the Senate—we wonder what the future holds for the seven nephews of mine and the millions of other men and women of the service when they return, should a person who is a banker first, last and all-the-time as Jesse Jones is, be in charge of RFC.

You know, Mr. Van Deventer, I cannot get excited about the warnings of what will happen to the common man if we do not play ball with the "selfish group." I still remember that the national debt was approximately fifteen billion bucks when Mr. Hoover was president, and the veterans were asking for a bonus. I remember how practically every banker of note and every economist—so-called—swore and be-damned that to pay that bonus would bankrupt the nation. I remember that when President Roosevelt asked for money for a works project program, the same howl was made. Subsequent experience has proved that all those prognosticators were just so many damn liars. Furthermore, those who still worry about the monetary debt of this nation should get hep to the fact that our wealth is in the character, intelligence and productive capacity of our people, the fertility of the land and our many natural resources. If provided with jobs, our people will pay off all they owe with sweat. However, it is a function of government to provide the opportunity to work if, as in the 30's, industry fails to do so. Then with banks bulging with money and labor begging for an opportunity, we had only one man who could come up with a plan to make money circulate even in a limited manner and that man was the fellow you dislike—President Roosevelt.

*M. L. STEWART,*
*General Manager*

*Stewart Ice Machine Co.,*
*1046 E. 22nd St., Los Angeles*

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## LOW PRICES BUILD SALES

Sir:

Each week I look forward to reading your editorial. The one entitled "Purchasing Power from Price Reduction," particularly interested me, and I should like to obtain copies of Mr. Roland P. Soule's papers entitled "Technology and Employment," and "Technological and Industrial Trends."

*WALTER A. HURLEMAN,*
*Production Engineer*

*Jacobs Aircraft Engine Co.,*
*Pottstown, Pa.*

Sir:

Can you tell us where copies of these Roland P. Soule speeches are procurable?

*A. P. BARNASKEY,*
*Manager*

*Westcott Chucks Co.,*
*Oneida, N. Y.*

Sir:

. . . I would like to secure complete copies of the two papers by Roland P. Soule which are discussed in your editorial. . . .

*N. G. MILLS,*
*Staff Supervisor,*
*Time & Motion Study Dept.*

*Westinghouse Electric & Mfg. Co.,*
*Sharon, Pa.*

Sir:

One of our engineers requests a copy of "Technological and Industrial Trends" mentioned in an editorial in THE IRON AGE. We take *Chemical & Engineering News* and so were able to get "Technology and Employment."

*LONA L. THURBER*

*Oneida Ltd.,*
*Oneida, N. Y.*

Sir:

Could I obtain copies of Mr. Soule's papers. The philosophy of Mr. Soule's text is not followed out in many cases by the steel industry. While I know the prices for many steel products have not shown a profit, I am thoroughly convinced that they might if more attention was given to cost reduction in manufacturing methods. Also, there is a tendency for some in the steel industry to operate on a policy of—"get the market to take what we can make"—as opposed to a policy of making what the customer wants.

*J. P. DODS,*
*Director of Advertising*

*C. W. S. Affiliates,*
*Norristown, Pa.*

Sir:

Please send us the addresses of the American Chemical Society and the Textile Research Institute of New York. We would like to obtain some pamphlets from them.

*L. C. BATES,*
*Editor*

*Screw Machine Engineering,*
*45 Exchange St., Rochester 4, N. Y.*

● Reprints of Roland P. Soule's articles "Technology & Employment" and "Technological & Industrial Trends" may be obtained by writing to Mr. Soule at the American Machine & Foundry Co., 511 Fifth Ave., N. Y.—Ed.

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## 1019 vs. 1020

Sir:

We should like to obtain information on the application and fabricating characteristics of cold drawn steel AISI-C1019. Apparently this is coming to be a popular analysis in local warehouse stocks. Why? Can it be substituted for general purpose applications in place of 1020? Due to high manganese content, it seems more comparable to C1022.

*T. JOSEPH CUERDON, JR.,*
*Metallurgist*

*Stromberg-Carlson Co.,*
*Rochester, N. Y.*

● Many warehouses find their customers, especially those with Army and Navy work, prefer the 1020 analysis. However it is possible that some local situation makes 1019 more popular in your vicinity than 1020. Due to the higher manganese content of 1019 the surface quality of this steel is improved and a deeper case is possible after casehardening. There is some evidence that threading and machining characteristics are better than 1020. In flat form, 1019 apparently fabricates better in punch presses, affording a cleaner break.—Ed.

---

## REROLLED ANGLES

Sir:

Can you supply us with a list of mills that reroll railroad stock into angle irons which could be used for metal beds. We understand that the regular structural angle irons are not the type of angles used for metal beds.

*J. G. EDELEN,*

*J. G. Edelen Co.,*
*5 W. Redwood St., Baltimore 1, Md.*

● Rerolled rails are used for this and similar applications primarily because the metal is satisfactory for the purpose and also cheaper than ingot steel. To obtain angles from rerolled rails we would suggest you write to any of the following: W. Ames & Co., Jersey City, N. J.; Buffalo Steel Co., Buffalo, N. Y.; Jersey Shore Steel Co., Jersey Shore, Pa.; Sweet Steel Co., Williamsport, Pa.—Ed.

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## PRECISION CASTING

Sir:

The article, "Refractory Molds for Precision Casting," by Jules W. Glaser, in the Feb. 8 issue, was very informative and represents the first complete work I have seen on refractory molds of this type.

*S. O. FISHER,*
*Schenectady Works Laboratory*

*General Electric Co.,*
*Schenectady, N. Y.*

# T & W Combined Know-How

• • • COLD WORKING of sheet steel into deep drawn shapes is a tricky job and requires experience. The amount of draw must be considered, die design, metal flow, grain structure, to mention only a few. Here at Transue's we have the equipment and the personnel with wide knowledge and long experience. T & W customers trust us with their difficult deep drawn stampings.

*Designers and Makers of Deep Drawn Stampings*

**TRANSUE & WILLIAMS**
**ALLIANCE, OHIO**

Sales Offices: New York, Philadelphia, Chicago, Detroit, Indianapolis, Cleveland

# This Industrial Week . .

- **Better Steel Output Not to Change Deliveries**
- **Carryovers Running 33 to 40 Per Cent of Output**
- **Shells to Take 10 Per Cent of Second Quarter Steel**

MARCH, the proverbial month for steel production peaks, will see substantial improvement in the steel operation picture when compared to recent periods, but the betterment will not lessen the tightness in steel deliveries. Already there are some signs that steel ingot output has had to be gaged closer to restricted finishing mill operations which have suffered because of manpower shortages.

The manpower shortages in the steel industry are more serious than being just a matter of so many employees needed. The real shortage is in certain types of skilled and unskilled labor at spots where the lack of such help eats into output. While ingot production has been bettered recently, the processing of steel into finished products has slowed down thus causing raw steel in some cases to be in excess of finishing mill needs. With the draft making more inroads in steel mill forces and with the present manpower in the most skilled jobs bordering close on the point of exhaustion after three years of record breaking activity the immediate outlook for significant increases in steel output is not promising.

While the steel industry was satisfied to see an ending of severe weather conditions but was still struggling with manpower deficiencies, the heavy volume of steel orders and directives were such as to confound even the best efforts to solve the problem of better distribution. Carryovers this week were still heavy and one major producer reported those in February to be the largest in the history of the company. In that month, carryovers generally ran as high as 33 to 40 per cent of output.

An analysis of some delayed shipments shows that from 10 to 15 per cent of the total carryover recently involved material for which January or earlier delivery had been indicated. Despite pleas by WPB that customers cancel advance orders for which authorization was nullified by severe cuts in second quarter CMP allotments, mills report cancellations the lowest in months. Unless action is taken soon, April rolling schedules will be so firmly entrenched that revision can be made only with great difficulty.

Some industry criticism has been leveled at the refusal of the armed forces to concern themselves with production problems after suddenly heaping large orders on steel mill books. Although producers may eventually be able to again perform production miracles for a limited time, lack of cooperation in solving labor, transportation and scheduling problems could, unless a more cooperative attitude materializes, paralyze a large segment of industry for lack of steel. This is the major headache with which the recalled steel men in the WPB steel division now grapple.

Further complicating the steel delivery situation is the heavy demand for shell steel. About 10 per cent of the entire second quarter steel output appears to be earmarked for shells and rockets. Some sources believe that this substantial program might be trimmed down when Germany collapses, but this remains problematical. The allocation which may amount to about 1,500,000 tons in the second quarter does not include components or bombs, but involves only shell and rocket bodies.

THE WPB is still having difficulty in placing steel sheet tonnages. Last week's mention of 400,000 tons for which there was no "home" may have been conservative. WPB is currently attempting to place 240,000 tons of drum sheets for France on already jammed second quarter schedules. The new Navy ship program fortunately is not expected to have too much of an effect upon flat rolled schedules, mainly because it will be completed over a long period. Approximately 650,000 tons of plates will be needed for this project.

The irresistible action of the military in demanding the front seat in the steel supply picture, plus manpower difficulties in the steel industry, holds out little hope for satisfying restricted civilian requirements for the next two quarters at least. Just how much military cutbacks will amount to when Germany is defeated continues to be a much debated question. Estimates run all the way from 10 per cent to 35 per cent. It is expected, however, that the tenacious hold of the Armed Forces on the distribution of steel supplies can only be unloosened after considerable discussion and desk pounding on the part of those who believe in the necessity for rapid reconversion.

The Army has ordered 269 30-ton box cars from Pullman Car Mfg. Co., but construction authorization has not yet been given. Authorization has been granted to American Car & Foundry to construct the previously reported 2000 56-ton flat cars for Russia, and the schedule is as follows: 600 each in July, August and September and 200 in October.

Steel ingot production this week has fallen half a point to 94 per cent of rated capacity from last week's corrected rate of 94.5 per cent. Chicago operations are up half a point to 101.5 per cent while in Youngstown production has increased one point to 91 per cent. The operating rate at Wheeling which has been revised to 65 per cent to account for the shut down of the Portsmouth plant because of the flood has regained 20 points to 85 per cent. In Detroit, steelmaking has gained one point to 99 per cent. District operations which show decreased operating rates are Pittsburgh, down one to 91 per cent; Cleveland, down one to 96 per cent; the Western District, down three and a half to 86 per cent; Cincinnati, down 29 points to 61 per cent and the Eastern District, down 10 points to 85 per cent. Philadelphia at 97 per cent; Buffalo at 104.5 per cent; Birmingham at 99 per cent, and St. Louis at 94.5 per cent continued unchanged.

• **FRENCH LEND-LEASE**—Through the State Department the French have concluded a $2,575,000,000 lend-lease agreement in which the following items are included: For short-lived manufacturing equipment, $250,000,000; for long-lived capital goods, these items, among others, include—locomotives, $200,000,000; railroad cars, $120,000,000; metal working machinery, $100,000,000; industrial equipment, $150,000,000; machinery for mines, arsenals, etc., $100,000,000. In the above are some $600,000,000 in industrial equipment and machine tools. War demand is so heavy in the United States that delivery dates on this French business is bound to be indefinite.

• **TERMINATION BIBLE**—The Joint Army-Navy Termination Regulation is the "Bible" for war contractors to be used in the rapid settlement of war contracts. A recent survey discloses that less than 40 per cent of the war contractors circularized had availed themselves of this publication. It is imperative that contractors holding war contracts be placed on the mailing list for the regulation and all subsequent changes—there is no charge. Contractors merely have to write to the Joint Army-Navy Distribution Center, 90 Church St.,, New York, attention of Lt. E. P. Lull.

• **COLD DRAWN BARS**—According to the WPB Steel Division the cold drawn steel supply situation will be very tight during the second and third quarters of 1945, with insufficient tonnage in sight to meet all requirements.

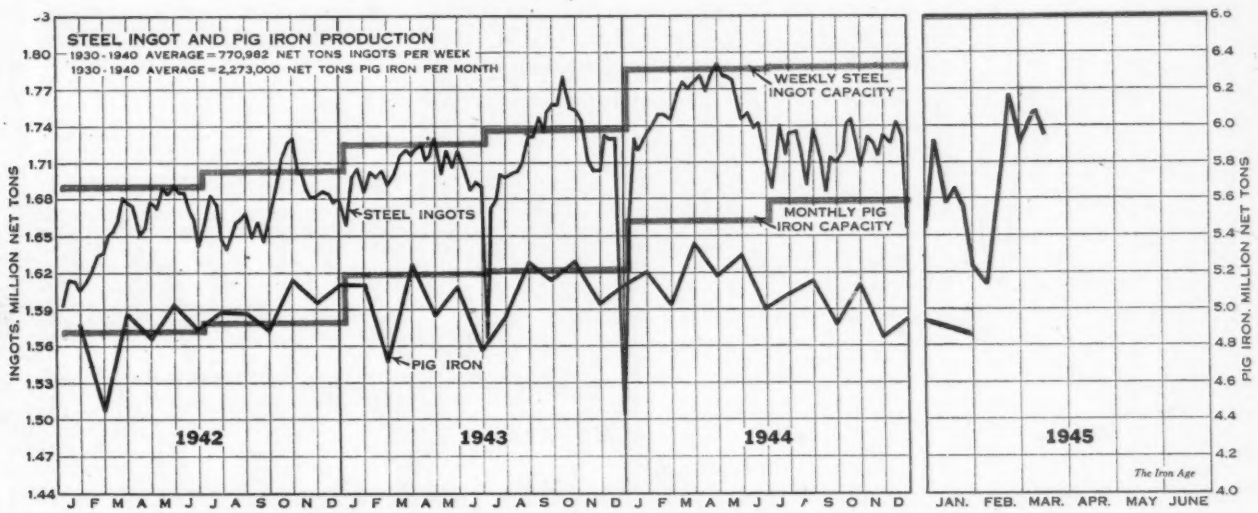
• **LOCOMOTIVE BEARINGS**—Timken Roller Bearing Co. has been awarded a contract to supply all engine and trailer truck bearings for the 700 locomotives being built in this country for the French Government. These locomotives are of the type formerly known as the MacArthur, but recently renamed the MacArthur.

• **COKE OUTPUT AND INVENTORY**—The production of both by-product and beehive coke in the United States as reported to the Bureau of Mines amounted to 6,033,236 net tons for the month of January, 1945. This was an increase of 25,051 tons over the December output and was attributable to the increase of 51,950 tons from beehive ovens as production from by-product ovens dropped 26,899 tons. Stocks of by-product coke at producers' plants decreased 235,368 tons during January, and on Feb. 1 were equivalent to 5.1 days' production at the January rate. Stocks of coking coal at by-product plants decreased 417,037 tons during January, and on Feb. 1 were sufficient for 22.2 days' supply at the rate of consumption that prevailed in January. Flood conditions recently probably changed the supply figures for coking coal.

• **CANADIAN BUILDING RESTRICTIONS**—Canada's construction control restrictions on small building projects has been tightened, C. D. Howe, Minister of Munitions and Supply announced. Under a new order, issued by Construction Controller J. P. MacKenzie anyone undertaking to construct, repair, add to, alter or install equipment in a building other than a plant, must first obtain a construction control license if the project is to cost more than $500. Houses, duplexes and apartment houses come within the definition of "a building other than a plant."

• **FEBRUARY INGOT OUTPUT DOWN**—Although calculated weekly production of steel ingots during February was almost back to the December level, total ingot production for February was approximately 500,000 tons lower than in January, according to the American Iron & Steel Institute. The February production was 6,657,703 tons, against a revised total of 7,204,303 tons made in January and 7,188,317 tons made in February, 1944. Operations averaged 90.9 per cent of capacity in February, compared with 88.8 per cent in January and 96.9 per cent in February, 1944. The calculated weekly production in February was 1,664,426 tons, against 1,626,253 tons in January and 1,736,308 tons in February, 1944.

• **WHITE COLLAR HOURS**—To help overcome increasing shortages of manpower, the Jones & Laughlin Steel Corp. recently put into effect a new working schedule for its office employees that boosts total hours worked from 40 to 42.5 per week. To compensate for longer working schedule, employees making $315 a month or less are being paid time and one-half for the extra hours worked, which averages out as a pay increase of a little over 9 per cent. Employees earning up to $5000 are paid extra straight time, which is equivalent to about a 6¼ per cent increase on their base pay. Employees earning between $5000 and $7000 are paid extra on a decreasing basis.


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE=770,982 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE=2,273,000 NET TONS PIG IRON PER MONTH
WEEKLY STEEL INGOT CAPACITY
STEEL INGOTS
MONTHLY PIG IRON CAPACITY
PIG IRON
INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
1942
1943
1944
1945
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE
The Iron Age

## *Steel Ingot Production by Districts and Per Cent of Capacity*

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| March 6 | 92.0 | 101.0 | 90.0 | 97.0 | 97.0 | 104.5 | 65.0* | 99.0 | 98.0 | 90.5 | 91.0 | 94.5 | 95.0 | 94.5* |
| March 13 | 91.0 | 101.5 | 91.0 | 97.0 | 96.0 | 104.5 | 85.0 | 99.0 | 99.0 | 88.0 | 60.0 | 94.5 | 85.0 | 94.0 |

* Revised

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# Second Quarter CMP Allotment Cut May Not Shorten Delivery Promises

*Chicago*

• • • Results of severe second quarter CMP steel allotment cuts for other than war agencies will be varied in this region which throughout the war has been the fountainhead of essential civilian production.

Although the product mix will be realigned gradually as cancellations of orders placed on advance allotments begin to drift in, steel mills do not expect any drastic shortening of extended delivery dates now being quoted on all products. By freezing, for its own disposal, sheet and strip openings resulting from cancellations, the War Production Board has in effect given notice that the delivery situation has little prospect of becoming more favorable for the garden variety customer. Although WPB has promised to be less liberal with order directives, the vast tonnage, now in WPB's hands awaiting placement, will undoubtedly plug any openings which may occur.

Whether or not it is part of the same pattern, the effect of severe allotment cuts, to such industries as farm equipment and railroad equipment, may have very much the same effect for industry as stringent manpower measures have for labor. Plants that may have excess capacity as a result of inability to secure material must either secure appropriate war goods contracts or release excess labor, if any. Most of the so-called "essential goods manufacturers" have been at a disadvantage in recruiting labor because of relatively less favorable manpower priorities, yet they have been in the labor market. Unless they replace cancelled civilian goods schedules with direct war work, they will be removed entirely as competitors in the labor market, leaving the field clear for the high priority plants —including the steel mills.

No charges have been made openly, but it is apparent that in many cases the government has done a rather poor job of selling the all-out emergency to certain branches of industry, particularly since the Western Front push. Even though military planning will not permit open consideration of such a possibility, many manufacturers feel that they cannot lay realistic plans without taking into account a probable early end to European hostilities. Therefore, there has been a reluctance to entirely commit all facilities to long-range military production programs while peacetime competitors are less than fully committed. In other words, there still is a jockeying for position in the postwar race among manufacturers just as there is a jockeying for postwar jobs and seniority among labor.

The cut in industrywide allotments will have the effect of turning the heads of all factors within an industry to stated requirements of the military, for the military, with its allotments virtually intact, is the only customer which can guarantee material.

Railroads and farm groups which repeatedly have asserted that any cut in production of material and equipment for their use would bring chaos now have their challenge accepted. War Food Administration has warned that farm equipment production was inadequate to maintain food production even before the second quarter slash. If their fears have been well founded, there should be hungry mouths next year, even though as much equipment will go to the farmers this year as in some of the better pre-war years when labor was abundant. Likewise, the railroads, which have argued that what would have been considered heavy rail and equipment purchasing power pre-war is insufficient to carry war traffic will be able to prove their case by breaking down partially or completely. The current car shortage at steel mills and factories in this area tends to indicate that they have not been bluffing.

Probably the worst aspect of the allotment cuts from the standpoint of efficient distribution of steel is the amount of material which will be stagnated in user's inventories. In many cases it has been customary to purchase steel requirements for a long term production program. When special analyses are required such ordering is almost mandatory in order to secure a place on mill schedules. Because much of such special steel is not adaptable to other uses, it must lie dormant until it can be utilized for the use for which it was purchased. Even if inventory steel is of a type that can be used elsewhere, the redistribution process involves time complications.

There is some question as to what extent steel deliveries to the Armed Services can be moved forward, even though considerable civilian tonnage is stricken from the books. With mill carryovers mounting to unprecedented heights, a most optimistic outlook is that the amount eliminated will balance the portion, the overload which could not have been produced anyway, thus putting the mills even with their delivery promises. A more conservative view holds that before military deliveries can be improved greatly it will be necessary for the services to do some housecleaning of their own, eliminating tonnages which cannot be justified as urgent, and scheduling their own tonnage in relative order of importance.

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**PITTSBURGH FLOOD:** ***Floods halt building of LST's and other landing craft, when the Ohio River flooded the outfitting dock building of the American Bridge Co., near Pittsburgh. Shipyard ways are in the foreground.***

# WPB Raps Claimant Agencies As New Directive Procedure Is Issued

*Washington*

• • • **WPB used some** harsh words in establishing new procedure for claimant agencies' use of directives on March 1, and details of the procedure not hitherto made public by WPB were contained in CMP Bulletin No. 57.

The Bulletin rapped the claimant agency practice of not ordering far enough in advance for normal processing lead times and underscored the fact that directives are intended to remedy immediate emergencies and not to be used as super-priorities, or to anchor advance orders into schedules.

The text of WPB's procedure follows:

"During the past several months, there has been a widespread tendency toward increased application for WPB directive action to expedite deliveries of controlled materials and to place orders in production schedules. The volume has in some cases become so large as to interfere seriously with production.

"Rearrangement of schedules pursuant to directives almost always adversely affects production to some degree, and often throws out of schedule orders of equal or greater urgency. "This in turn creates more pressure for directives. Action of this sort must therefore be held to the absolute minimum consistent with the fulfillment of urgent programs."

WPB says that directive action should be requested only if:

1. The program affected is of high urgency.

2. The contractor involved has failed to get assurance of delivery at the required time from any available source of supply without directive action.

3. The contractor's inventory position cannot sustain the necessary production, without the requested expediting of component and material delivery, and

4. Urgent production would actually be interrupted through failure to get delivery at the date specified. (WPB has discovered on numerous occasions that directives have been used when contractors' inventories have been substantial, and to get material far in advance of actual needs.)

From now on to get a directive, the following information must be shown:

1. The specific end product or component, production of which would be lost by the failure to receive the specified quantity of material in the month requested.

2. The date at which production of the end product would actually be interrupted by failure to receive requested delivery.

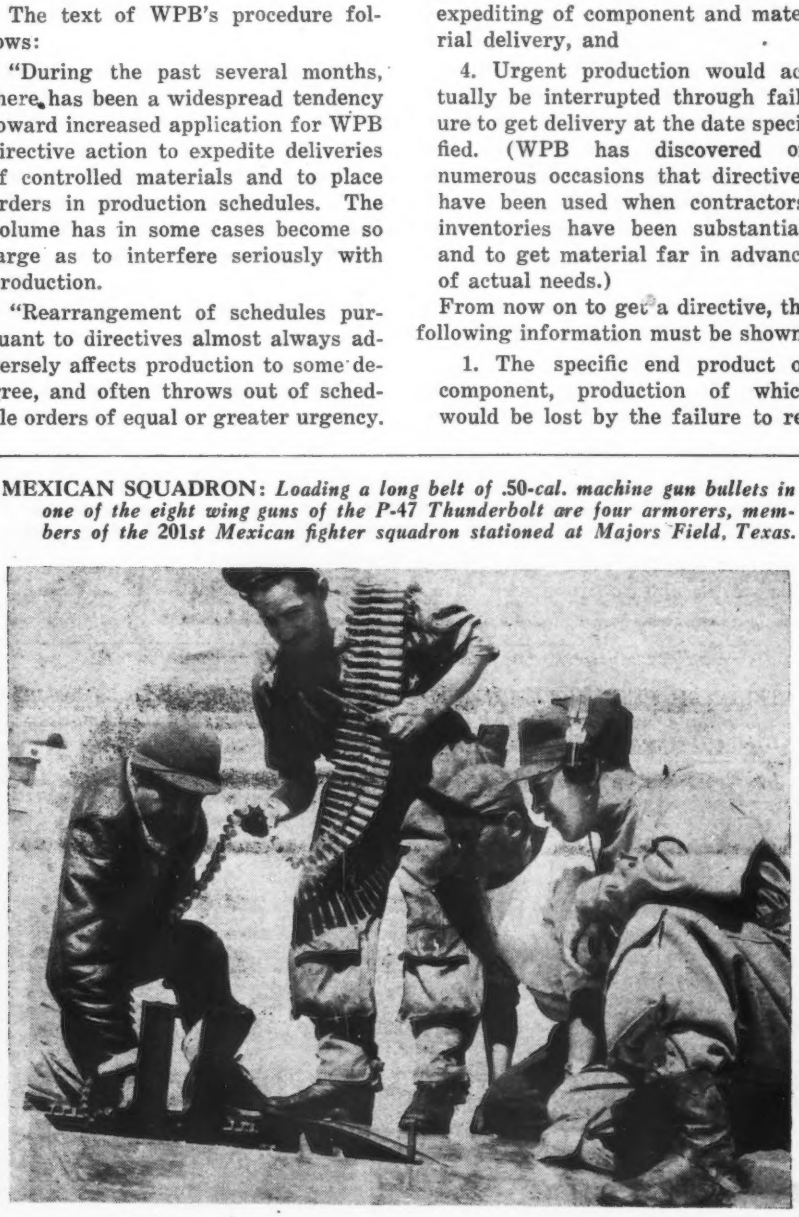
3. That inventory on hand or on order for shipment by the time requested is insufficient to maintain production. If possible the actual inventory on hand should be noted.

4. That the consumer and the sponsoring service officer have been unable to locate a source of supply that can meet the required delivery date without directive assistance. The names and addresses of suppliers must be stated.

5. The date at which the order for the material was placed and the delivery time then promised by the supplier.

The information must be certified either by the contractor or the official (normally the officer assigned to the plant) requesting the directive assistance. In the case of non-procuring agencies, the user and the responsible field officer in the area shall certify.

MEXICAN SQUADRON: *Loading a long belt of .50-cal. machine gun bullets in one of the eight wing guns of the P-47 Thunderbolt are four armorers, members of the 201st Mexican fighter squadron stationed at Majors Field, Texas.*



## J&L Complies with Board Order but Protests Officially

*Pittsburgh*

• • • **The Jones & Laughlin** Steel Corp. telegraphed the War Labor Board on March 10 that "Under protest and without prejudice to its legal rights" it has complied with the board's directive order of last December and its telegram of March 8 by making effective today the board's terms and conditions of employment for plant guards at the company's Pittsburgh Works, which includes maintenance of union membership and the check-off of dues.

The company's claims that the board's directive and telegram "are in violation of the legal rights of this corporation and contrary to the decision of the Sixth Circuit Court of Appeals" which in an identical case involving the plant guards at the J & L Otis Works, Cleveland, held that "It is detrimental to the public interest and the free flow of commerce for the union to represent plant guards and production and maintenance workers."

The company's telegram also stated that its action of compliance "Is subject to the outcome of the pending proceedings against the National War Labor Board and the United Steel Workers of America in the Federal Court of the District of Columbia."

# Possibility of Coal Strike Based on Demands Described by Lewis

*Pittsburgh*

• • • While coal was important but still a secondary figure during the initial half of March because floods and high waters held up deliveries to the Western Pennsylvania, Ohio, and West Virginia areas, now the full spot goes on coal because of the threat of complete stoppage of production on April 1.

Floods depleted coal stocks in the Pittsburgh, Wheeling, and Youngstown area, but even more threatening is John L. Lewis' ability to pull the miners out on strike if he doesn't get his demand of 10c. a ton royalty on mined coal to provide "medical and surgical service, hospitalization, insurance, rehabilitation, and economic protection," and his demands for a 35 hr. week, liberalized vacations, and shift differentials.

Coal stocks for coking purposes are anything but comfortable. They run from six days to about three weeks. Carnegie-Illinois Steel Corp., while it reports a six to seven days' supply, actually has on the ground at the mill about four days' supply. The remainder is either on the ground at the mines or in transit.

Jones & Laughlin Steel Corp. is about the best prepared, with some 15 days' supply on hand. Youngstown Sheet & Tube Co.'s stocks are estimated at between two and three weeks. Pittsburgh Steel Co. feels that its stocks will carry the company through about six to eight days peak operations. Other U. S. Steel subsidiaries in Youngstown, Chicago, Cleveland, and Lorain carry stocks sufficient for about three weeks' operation.

In all cases, however, a strike will affect production much sooner than the stocks would indicate. C-I's Pittsburgh operations would be affected immediately, as would those of any company with less than a two weeks' supply of coal. J. & L. would begin to trim operations within a week, and the U. S. Steel subsidiaries with three weeks' supply of coal would begin to cut operations in about 10 to 12 days. This would result because the coal in depleted piles is harder to get at and handle and also because there would be an attempt to stretch existing supplies as far as possible.

Consequently, coal is perhaps the most serious threat to production of the many war items so badly needed now by the allied armies that are getting poised for a death thrust at Nazism. According to some sources it is conceivable that an April 1 coal strike may delay that blow because of the lack of materiel.

Without the floods and strike threats, the position of the nation in so far as coal is concerned is serious in itself. This year, coal production is falling substantially behind mine output last year. Total coal production to March 4, 1944, was 114,964,000 net tons, or 8.8 per cent more than the 104,795,000 tons mined from Jan. 1 to March 3, 1945. Furthermore, the trend of coal stocks at by-product coke plants and steel and rolling mills has been steadily downward. By-product plant stocks dropped from a high of 26 days in November to 22 days in January, and an estimated 19 days by the end of March. Coal stocks at steel and rolling mills dropped from a high of 32 days in July to 19 days in January, 1945, and will have an estimated 15 days' supply by the end of March.

While the government policy has been to appease the miners and tacitly grant all their demands in the past, a strike this year will put those bureaus of the government that deal with coal firmly on the spot. Operators estimate that the demands will cost them about $400,000,000 a year, or about $3.30 a day for each miner. While there is always the possibility of compromise in such cases, John L. Lewis is known rather widely as an uncompromising gentlemen, and it may take government action to avoid a long strike. If this turns out to be the case, it is likely that nothing will be definitely settled, but strike action may be postponed long enough to clean up the war in Europe.

## Passenger Car Plants Await Go Signal for Building

*Chicago*

• • • Passenger car construction will be commenced by Pullman-Standard Car Mfg. Co. the moment permission is given, and cars which have been ordered and engineered prior to that time will be delivered less than five months later, according to Thomas P. Gorter, vice-president.

The company states it already holds orders for several hundred new passenger cars from railroads in all sections of the country. After car-building is resumed, Pullman-Standard plants at Worcester, Mass., and Chicago, will produce between 175 and 200 cars a month.

FIRST IN THE PHILIPPINES: *Hundreds of curious Filipinos gather with men of the 5th Air Force as the first Army helicopter to operate in the Philippines lands. Helicopters have already proved useful in evacuating wounded from inaccessible mountain areas in Leyte and for other assignments not suited to fixed-wing aircraft.*

## Installs 12 Batteries Of By-Product Coke Ovens in War Period

***New York***

• • • **Twelve batteries** of by-product coke ovens, totalling 682 ovens, with an annual coal capacity of 5,951,900 tons have been furnished by the Wilputte Coke Oven Corp. in the war period to date.

In the United States, Wilputte plants have been built during the war for the following firms, with the number of ovens noted for each: E. I. du Pont de Nemours & Co., Morgantown, W. Va., two batteries, 74 ovens; Semet-Solvay Co., Ironton, Ohio, one battery, 76 ovens; Tennessee Products Corp., Chattanooga, Tenn., one battery 20 ovens; Bethlehem Steel Co., Lackawanna, N. Y., two batteries, 152 ovens; Carnegie-Illinois Steel Corp., Gary, Ind., one battery, 77 ovens; Republic Steel Corp. at Warren, Ohio, one battery, 61 ovens; at Gadsden, Ala., one battery, 65 ovens; at South Chicago, Ill., one battery, 75 ovens; Interlake Iron Corp., Perry Works, Erie, Pa., one battery, 35 ovens.

Under construction for Citizens Gas and Coke Utility, Indianapolis, Ind., is one battery of 47 ovens.

## Shell Steel Program Taking 10 Per Cent In Second Quarter

***Pittsburgh***

• • • **The shell program,** which could conceivably fold up over night, is currently scheduled to take a bigger bite out of second quarter steel production than has ever been directed into this phase of war production since the beginning of the war. A total of just short of 1,500,000 tons, or a little less than 10 per cent of the finished steel capacity, has been earmarked for shells and rocket bodies during the second quarter of this year.

Mills are being loaded to the gunwales with shell steel orders and the net result has been a terrific cutback in billets, rails, seamless pipe and other commodities, the basic materials of which can be diverted into shell manufacture.

The good news from Europe is causing some to ponder the advisability of such heavy shell demands. While arm chair strategists will have nothing to do with what will or will not be ordered in the way of military supplies, they all point to the possibility and even likelihood of a quick final victory in Europe and a very drastic curtailment of needs for heavy shells.

The island warfare of the Pacific plus the fluidity of Japanese defenses (in no way as substantial or as deep as anything the Germans are now offering) will greatly obsolete the use of heavy, immobile artillery and emphasize the need for rockets and light, easily handled artillery. Consequently, second quarter shell production may well come for delivery long after the European phase of the war ends.

Aside from these speculations, however, Washington is obviously not taking any chances on shortages occurring again in shells. The production directive, while calling for nearly 1,500,000 tons of steel, just includes bodies for shells and rockets. It does not include shell components, which account for about 10 per cent of the steel going into the shell or, at the outside, another 150,000 tons. Neither does this total figure in bombs, which are a major project in themselves. While Germany and Japan are both within range of American, British and Russian aircraft, the bomb program will have to be maintained and later increased as "milk runs" are established over Japan.

## Rustless Signs With United Steelworkers

***Baltimore***

• • • **The first contract** between Rustless and the United Steelworkers of America—CIO was signed at the East Baltimore firm, producer of stainless steels.

"We are glad to say that during the negotiation of this first Rustless—CIO contract there were no issues left in dispute which had to be taken to the War Labor Board or to arbitration." C. R. Hook, Jr., secretary of Rustless, and Albert Atallah, director of District 8 of USA—C.I.O., declared in a joint statement issued here last week.

"In signing this two-year contract which runs until February 1, 1947, we have pledged mutual cooperation and understanding between labor and management in maintaining fullest production of stainless steels at Rustless which are vitally needed in the war."

Hook also announced that Rustless has applied to the War Labor Board for permission to pay its employees the retroactive night shift bonus premiums and increase in vacation benefits which are called for in the recent WLB steel industry wage decision, as Rustless was not included in the 86 companies directed to pay this increase.

RUSTLESS SIGNS: *C. R. Hook, Jr., left, secretary of the Rustless Iron and Steel Corp., and Albert Atallah, director of District 8, United Steelworkers of America-CIO recently signed Rustless' first contract with the union, and petitioned to be included in recent steel wage decision.*

## "Mystery" Layoffs, Employment Ceilings Clutter Labor Scene

*Cleveland*

• • • **War plants here** are meeting the challenge of greater production with the longest work week since 1928, and an increased number of employees. During February, the average work week was 50.3 hr. and 856 workers were added to employment lists in the 100 plants included in a monthly survey made by J. W. Vandenbosch, analyst for the Cleveland Chamber of Commerce.

Continued production pressure is the outlook for this month, with 34 of the 100 plants anticipating increased employment, 39 anticipating operations at the same level, and only three firms reporting possible layoffs. In the plants surveyed, employment has doubled in the last five and one-half years, and their total employment is now 122,752. Foundries gained workers last month because of labor importations and some aircraft plants also picked up a few.

Another optimistic note was sounded by Stuart Smith, regional director of the War Manpower Commission, who announced that the number of men available for work in critical war plants was expected to be doubled by the WMC's move to apply its male ceiling program to all local employers who hire eight or more persons.

Heretofore, this ceiling program affected only employers hiring more than 50 men, and will limit the number of men an employer may hire to carry on his business. The date on which ceiling will be based in affected industries is March 15, and a study will be made to determine the number of men needed in critical industries.

A supplementary survey will be made of less essential industries, including those hiring eight or more persons, to determine how many employees they can release. Based on the supply and demand discoveries, plants will be ordered to turn over from 5 to 10 of their men to critical war plants. Through this program, men above draft age are brought under job control for the first time, making the ceiling policy an adjunct to Selective Service in pressuring men into war work.

Furthermore, this order will cause men in less essential industries to lose years of seniority when they are forced to go into temporary war jobs, since there is no enforceable provision requiring an employer to give the transferred men their old jobs back when the war is over.

Meanwhile, in Cleveland, all normal procedures were by-passed in ordering a cutback of production adjustment of nacelles for B-29 Superfortresses which will require the laying off of several hundred employees of Fisher Body Plant No. 1, according to officers of local No. 45 of the UAW-CIO.

Union officials said they were trying to learn whether there was any significance in the fact that the cutback became effective the same day on which the 15-day escape clause in the maintenance of membership ordered last week by the National War Labor Board became operative.

Estimates of the number of persons to be laid off ranged from 225 to more than 300 out of a working force of almost 10,000. Government spokesmen who asked not to be identified said the adjustment was made necessary when the prime contractor for B-29's was found to be "overscheduled." Company sources had no comment.

In Youngstown, it was announced this week that a jump of nearly 55 per cent in the number of industrial firms making "must" war materiel occurred during February. Thirty-five companies now make "must" items compared to the 22 employed on these contracts during January. With this, the number of workers employed in these plants has increased from 16,000 to 47,000.

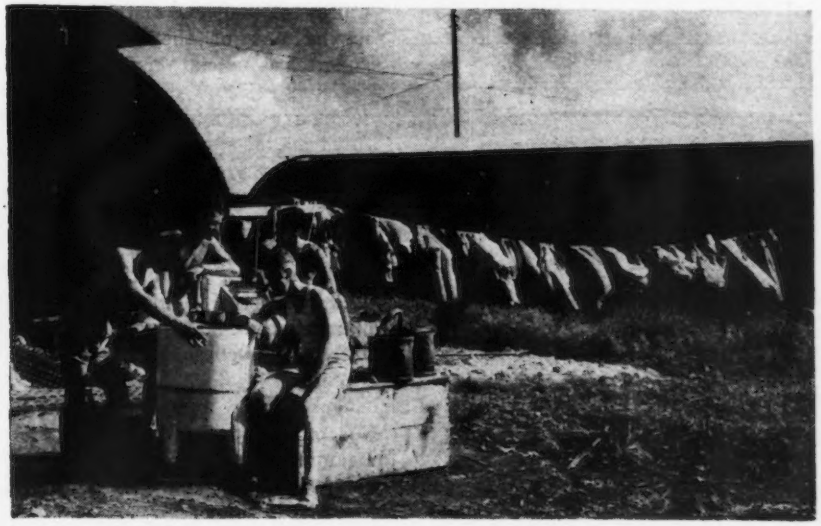
Underlying most of the current increase was the War Production Board's action in making steel a must item, and the number of workers here jumped from 9400 in nine plants to 40,200 in 17 plants as a result. In the Niles-Warren area, 12 plants are now on the must list as compared to nine in January and in Salem the ratio is now six to four.

In Dayton, a net loss of 8 per cent of female labor and 4 per cent of male labor was reported for the period between August, 1944, and January 1, 1945. Since the first of the year, female workers have continued to show a decline, according to WMC reports, but in the male labor field, the supply has increased slightly.

H. Glenn Johnson, acting WMC director for the Dayton area, stated: "We have less workers now than we had a year ago. Part of the reduction resulted from the army fields lowering their personnel total by about 10,000, in the past year, but part of it was also due to voluntary separations."

Dayton's situation will become even more critical by midsummer if the war in Europe has not ended, since draft quotas are up, and with the coming of good weather, farmers and Great Lakes seamen who have been working in Dayton plants, will be leaving.

**GI MAID:** *B-29 crewmen on Saipan have finally attained a long-sought comfort of Army garrison life in the form of a genuine washing machine, which they are now able to use instead of the old gasoline tin.*



## Axle Attachments Go Down

*Detroit*

• • • **This year's allotments** of third axle attachments for civilian units have been reduced to 3511 from 5934 allotted in 1944, the Regional War Production Board has announced.

Producers of gear-driven type third axles were given 1704 units, chain-driven type 472 and trailing type 1335.

# Krug Says Reconversion Plan Ready with Only Blanks Left to Fill

*Washington*

• • • **Declining to comment** on latest WPB reconversion plans, WPB Chairman J. A. Krug told THE IRON AGE on March 13 that he thought speculation about such plans caused confusion because no one could positively know what was going to be done until the defeat of Germany.

Asked if he had sent any reconversion plans to War Mobilizer James F. Byrnes, Mr. Krug said that many plans had been sent to Mr. Byrnes. He said he thought that speculation that had been going on for the past year and a half was harmful to WPB's desire to inform labor and management what lies ahead in the period after the defeat of Germany because they will say: "WPB said the overall cut will be 10 per cent one day and 23 per cent the next. They don't seem to know what they are talking about."

He declared that it was untrue that no reconversion planning has been done. He said that all that remained was to fill in the blanks when the information upon which planning could be based was submitted to WPB.

"What you have to have is a flexible plan and then when we know what is going to be required for phase 2 (the Japanese war) we can fill in the blanks," said Mr. Krug, "we have the plan."

Mr. Krug said that the War Department's preliminary figures on Japanese war requirements are expected to be submitted "today," but it would not be possible to finally fill in the "blanks" in WPB's plans, until the war against Germany is won.

"If the war against Germany had been won in 1943, as a lot of smart people predicted, we would have one plan; if it is over on April 1, we will have another; and on June 1, another," Mr. Krug said. He added that the public should know what tentative plans are within a week or 10 days.

Although Mr. Krug declined to confirm it, one WPB offiical declared on March 12 that Mr. Byrnes had suggested to Mr. Krug that tentative reconversion drafts include plans for a cutback of 10 per cent within 30 days, an 18 per cent cutback in 60 days, and a total of 33 per cent at the end of 120 days.

While the suggesed cutback of 33 per cent is a higher percentage than anyone has publicly mentioned, WPB officials are pointing out that it will only be a real cut of about 13 per cent. The reason for this is, it is said, that the increase in the Army supply program for 1945 over December estimates was 20 per cent, or about $9,000,000,000.

Meanwhile, around the first of March, Mr. Krug sent a memorandum to Field Operations Vice-Chairman James Folger stating that the ban on the spot authorization plan and on reconversion generally imposed by Mr. Byrnes in December should be continued until June 1, unless circumstances necessitate a change, pursuant to an interagency agreement.

# Special Court Says Alcoa a Monopoly

*New York*

• • • **The Aluminum Co. of America,** and Aluminium Ltd., Canadian firm which it organized, were declared Monday to be participating in "a monopolistic conspiracy in violation of the Sherman Anti-trust Act." A special panel of the United States Supreme Court handed down this decision without making a determination as to whether Alcoa should be dissolved.

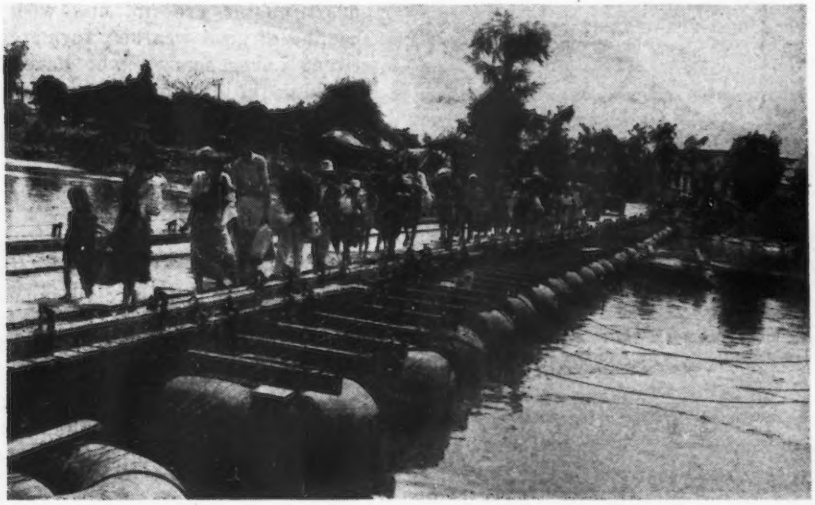
The special tribunal, created by act of Congress to hear the seven year old case when the supreme court was unable to produce a quorum of eligible judges, returned the case to the Federal district court for decision on the dissolution of Alcoa.

Judge Learned Hand wrote in the decision, "It is as idle for the plaintiff (government) to assume that the dissolution will be proper as it is for Alcoa to assume that it will not be. And it would be particularly fatuous to prepare a plan now, even if we could be sure that dissolution would be proper. Dissolution is not a penalty but a remedy; if the industry does not need it for protection, it will be a disservice to break up an aggregation which has for so long demonstrated its efficiency."

The decision made clear that the final ruling on any proposed dissolution of Alcoa may yet come from the nation's highest court. It reversed the earlier decision of Judge Francis G. Caffey of Federal district court following one of the longst trials in American judicial history. The new decision rejected the theory that the secondary aluminum market constituted actual competition before there were other producers of virgin metal in this country. It also reversed Judge Caffey's interpretation of the Sherman Act requiring proof of "specific intent" on the part of the monopolist, with the description, "nonsense," explaining that no monopolist monopolizes without consciousness of what he is doing.

The decision was based on the position of the special court that, "Alcoa meant to keep and did keep exclusive hold on the ingot market with which it started."

RETURN TO NEW LIFE: *Refugees stream across a pontoon bridge spanning the Upper Pasig River in the once-proud City of Manila, which now lies in shambles.*



# Steel Housing Gets Setback in British Orders for 30,000 Units

*New York*

• • • **Steel housing has been the subject of studies in England for rebuilding bombed out citizens, and although specific bids by mills in this country for the material necessary for the immediate construction of 30,000 housing units have been declined in favor of a wood frame design, future possibilities both in America and abroad are still considered promising by housing leaders.**

The sample units set-up in England on the steel design were in preparation for an estimated four million houses that must be built within the next ten years in that country. To achieve this program, an averge construction rate of 400,000 units per year will be required, with a possible peak year of 800,000 units.

The effort of the engineering firm of Braithewaite & Co., Ltd., in the steel unit type construction is said to require the least manhours of any proposal for mass construction. It is for a permanent type unit, not to be confused with the temporary Portal design.

*For further information on British housing see* THE IRON AGE, *Dec*, 28, 1944, *P.* 114.

The frames are supported on concrete walls about 1 ft. in width. The concrete is placed in forms standardized to suit both level and sloping sites. The steel frames extend continuously to the full height of the house. Each consists of two main verticals connected across by a number of horizontals. Provision is made for window and door openings by omitting appropriate horizontals.

According to a description in the British journal *Iron and Steel* both the verticals and the horizontals are cold rolled from steel strip of 14 and 16 gage respectively. An overall frame thickness of 3½ in. is maintained throughout. Horizontals are joggled inwards at their ends to fit between the inwardly directed flanges of the verticals, to which they are rigidly fixed by spot welding. These stay the verticals and provide backing support to the sheets of external cladding and internal lining. In this way the number of house plans that can be built up with the standard frames is unlimited.

STEEL HOUSING: *Use of steel for the rebuilding of British homes has received a setback with the ordering of* 30,000 *units of wood frame type.*

Angle cleats are spaced at intervals of about 2 in. up the length of adjacent verticals. In addition to connecting the "in-line" frames, they provide, with their inturned legs, a simple means of fastening the cover strips which secure the sheets of cladding and lining.

Along the tops of all beams strips of fiber-board, or the equivalent, are laid to provide a sound-insulation cushion, preventing the travel of sound from room to room throughout the structural framework.

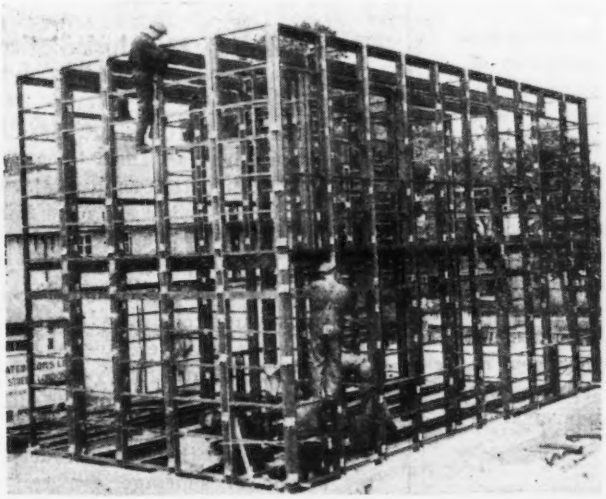
Intermediate beams supporting floors and roof are of inverted "U" section, 7 in. deep, cold rolled from 14G steel strip.

Beams and cleats are fabricated with "welded-in" nuts, so that at site the erector is concerned with the handling of a bolt only, instead of with the three details of bolt, washer and nut.

With thin steel sections, the question of rust-proofing is an important one. The steelwork for the prototype houses was painted, at the works, with three coats of rust-inhibiting and waterproof paints. Smaller details are galvanized.

The roof consists of slabs of lightweight cellular concrete, in standard grid sizes, 2½ in. thick, reinforced with steel mesh and finished in bituminous roofing material. The out-

(CONCLUDED ON PAGE 152)



# Industrial Briefs . . .

• SHAFT COUPLINGS BOOK — Link-Belt Co. has issued a new eight-page illustrated catalog, No. 2045, covering its complete line of shaft couplings. The book is available through the company's offices at Philadelphia, Chicago, San Francisco and elsewhere.

• BUYS PLANT — Alliance Mfg. Co. has purchased the plant formerly occupied by the Leigh Pottery Co., in which it has been operating for the past five years, according to R. F. Doyle, general manager, who said the purchase also included about 21 acres of land. A reported purchase price of $37,500 was paid.

• EXPERIMENTAL UNIT — Options on land near Avon Lake, Ohio, have been taken by the B. F. Goodrich Co. for construction of an experimental war chemical plant, according to a recent announcement by the company. Construction work on the unit is expected to start within the next few months after government approval has been obtained.

• COMPLETES PURCHASE—Negotiations for the purchase of the physical properties of the Steel Kitchens Corp. by the American Central Mfg. Corp. were completed recently. Comprising 70,000 sq. ft. of floor space and 12 acres of land adjacent to that already owned by American Central, the purchase will also provide the company with additional equipment required for augmented war production schedules.

• STEEL DATA CHART—Jones & Laughlin Steel Corp., Pittsburgh, recently issued a new Cold Finished Steel Data Chart. This new chart is the most complete and largest ever issued by the company.

• DIE COMPANY FORMED—Circle Cutting Die Co., Inc., Worcester, Mass., has been founded by Haig H. Mesrovian as president, Frank A. Kaminski as vice-president and Eino Karkanian as secretary and treasurer to specialize in clicker dies for the shoe industry.

• NEW SALES PROGRAM — Launching an expanded sales and service program, Thomas Machine Mfg. Co., Pittsburgh, has announced the appointment of sales agencies in 16 major cities to handle Thomas equipment for all of the United States east of the Mississippi River.

• FORD BUYS—Ford Motor Co., Dearborn, Mich., has purchased an industrial site at Houston, Tex., on which will be built a one-story parts building of approximately 87,000 sq. ft. of floor space, costing about $700,000.

• COMPLETES LABORATORY—Completion of the $2,000,000 laboratory of the Firestone Tire & Rubber Co. was announced by Chairman John W. Thomas, who said the new building "is the largest and most advanced research laboratory ever created for the development of improved tires and other rubber and plastic products."

The laboratory has prefabricated steel inner walls and partitions, an electronic microscope which magnifies 2000 times, X-ray diffraction apparatus, a quartz spectrograph and dozens of pieces of equipment designed by Firestone engineers.

• CLASSIFIED DIRECTORY — The ninth edition, 1945, classified directory of the Association of Consulting Chemists and Chemical Engineers, Inc., is now available without cost.

• AWARDED MEDAL—Louis Polk, president of the Sheffield Corp., Dayton, Ohio, has been awarded the gold medal of the Army Ordnance Association for outstanding service. Mr. Polk has been instrumental in the development of measuring instruments and gaging system standardization with Ordnance.

## *Carryovers Largest For Some Mills In History for Month*

***Pittsburgh***

• • • **Carryovers are one of the biggest headaches in the steel industry today. One mill reported this week that its February carryovers were the biggest in history, totaling close to 480,000 tons. In spite of the fact that March shipments will be the largest since November, 1944, carryovers into April will approximate those of February.**

Sheets and carbon steel bars apparently are the items that are experiencing the greatest difficulty insofar as production is concerned. Curiously enough, some plate mills likewise are running into extremely heavy carryovers. This condition has become so serious that mills are giving up hope of working it out and are looking expectantly forward to concellations at the end of the war in Europe to solve the problem.

Carryovers from February into March in some products, such as plates rolled on specific mills, have been so heavy that rolling even 100 per cent on carryovers, the mill will be unable to clean up the February business in March. This is the result of many factors that are impinging upon production, the least of which are not manpower and transportation.

Getting sufficient cars to ship finished goods and getting sufficient manpower to man the various finishing equipment is becoming increasingly difficult. While there has been some easing on the car situation, there are several mills in the Pittsburgh district that are working only four or five turns a week because finished material has piled up.

## Requests Veteran Jurisdiction

*Harrisburg, Pa.*

• • • **William H. Chestnut, head of the Pennsylvania Department of Labor and Industry, said this week that the USES and WMC have failed to find jobs for 7136 returned war veterans in the past five months, and recommends that the Commonwealth of Pennsylvania take over the agency. He said that war veterans have received $976,740 unemployment compensation benefits, because federal administrated bureaus could not or would not place them in jobs despite the manpower shortage.**

## Shipbuilding Leads As Steel Consumer

*New York*

• • • **Shipbuilding in 1944 again** was the nation's leading single consumer of steel, but not by as large a margin as in 1943, according to the American Iron & Steel Institute showing the distribution among consuming industries of shipments totaling 60,353,000 tons of steel products during 1944. In 1943, the distribution of 59,906,000 tons was reported. The report represented 95.6 per cent of the industry's total finished steel output.

Builders of merchant and naval vessels received 10,827,000 tons of steel last year, compared with 11,509,000 tons in 1943 and 9,440,000 tons in 1942. The tonnages going to shipyards represented 17 per cent of the total 1944 shipments, as against 19 per cent of the 1943 total and 15.6 per cent in 1942.

More steel was delivered last year than in 1943 to sveral major industry groups, including railroads, container manufacturers, agricultural equipment makers, and the oil, gas and mining industries.

A slight decline was indicated in the combined tonnage for such war uses as ordnance, projectiles, tanks, and export to allied and friendly nations. The decline resulted from reductions in exports which, for security reasons, are combined with certain war uses in the Institute's report. Nearly 12,875,000 tons were shipped under that combined category in 1944, as against 14,200,000 tons in 1943.

Jobbers, dealers and distributors received 8,008,000 tons of steel in 1944, about 13 per cent of total shipments, as against 6,824,000 tons in 1943. The railroad industry received 5,425,000 tons, or 9 per cent, last year compared with 4,527,000 tons the year before.

Two per cent of the 1944 shipments went to agricultural implement and equipment manufacturers, 1,092,000 tons as against 1943 shipments of 713,000 tons.

Container manufacturers received 3,696,000 tons in 1944, or about 6 per cent of the total. That compared with 3,574,000 tons in 1943.

The automotive and aircraft industry received 3 per cent of total shipments last year, 2,039,000 tons as against 2,519,000 tons in 1943. About 4,454,000 tons were utilized by the construction industry in 1944, compared with 4,485,000 tons the year before.

Oil, natural gas and mining industries received 1,479,000 tons in 1944, as against 1,380,000 tons in 1943. Machinery and tool makers got 2,486,000 tons last year and 2,531,000 tons in 1943.

Over 2,291,000 tons went in 1944 to the pressing forming and stamping industry as against 2,484,000 tons in 1943, while the steel converting and processing industries reeceived 5,589,000 tons last year compared with 5,170,000 tons in 1943.

**Steel Shipments By Consuming Industries**
*Source: American Iron & Steel Institute*

| | 1944 (Net Total) |
|---|---|
| **1. STEEL CONVERTING AND PROCESSING INDUSTRIES** | |
| (a) Wire drawers and wire product manufacturers | 641,310 |
| (b) Bolt, nut, and rivet manufacturers | 1,153,995 |
| (c) Forging manufacturers | |
| (1) Automotive and Aircraft | 596,971 |
| (2) All other | 1,557,003 |
| (d) All other steel plants and foundries | 1,640,063 |
| Total | 5,589,342 |
| **2. JOBBERS, DEALERS AND DISTRIBUTORS** | |
| (a) Oil and natural gas industry | 570,921 |
| (b) All other | 7,437,155 |
| Total | 8,008,076 |
| **3. CONSTRUCTION INDUSTRY** | |
| (a) Public (Municipal, State, National) | 72,191 |
| (b) Highways | 173,315 |
| (c) Railways | 87,755 |
| (d) Automotive and Aircraft | 109,516 |
| (e) Utilities | 236,639 |
| (f) Building trim, accessories and builders' hardware | 438,323 |
| (g) All other | 3,336,746 |
| Total | 4,454,485 |
| **4. SHIPBUILDING INDUSTRY** | 10,287,299 |
| **5. PRESSING, FORMING AND STAMPING INDUSTRY** | |
| (a) Metal furniture and office equipment | 159,017 |
| (b) Hardware and household equipment | 369,549 |
| (c) Automotive | 1,285,913 |
| (d) All other | 1,106,834 |
| Total | 2,921,313 |
| **6. CONTAINER INDUSTRY** | |
| (a) Oil and natural gas industry | 400,007 |
| (b) All other | 3,296,374 |
| Total | 3,696,381 |
| **7. AGRICULTURAL, INCL. IMPL. & EQUIP. MFRS.** | 1,091,798 |
| **8. MACHINERY AND TOOLS** | |
| (a) Machinery and tools, not incl. electrical equipment | 1,690,077 |
| (b) Electrical machinery and equipment | 796,226 |
| Total | 2,486,303 |
| **9. AUTOMOTIVE AND AIRCRAFT INDUSTRY** | 2,039,086 |
| **10. RAILROAD INDUSTRY** | |
| (a) All railroads | 3,868,455 |
| (b) Car and locomotive builders and parts manufacturers | 1,556,343 |
| Total | 5,424,798 |
| **11. OIL, NATURAL GAS AND MINING INDUSTRY** | |
| (a) Oil and natural gas, including pipe lines | 1,266,855 |
| (b) Mining, quarrying and lumbering | 212,480 |
| Total | 1,479,335 |
| **12. MISCELLANEOUS INDUSTRIES AND EXPORT** | 12,874,474 |
| **13. Total (Items 1 to 12)** | 60,352,690 |

*During 1943 the companies included above represented 95.6% of the total output of finished rolled products.*

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## More Engines And Rockets on Lists

*Washington*

• • • WPB officials on March 13 informed the Steel Products Industry Advisory Committee of an estimated $1,000,000,000 replacement demand for liquid-cooled internal combustion engines and parts that must be met in addition to the mushrooming demand for rockets and shell steel. WPB officials and committee members agreed that steel demands since the first of the year required heavy use of directives to assure early deliveries but it was also contended that they had been used excessively.

As an alternative to directive action, steel mills were advised to refer claimant agencies to WPB's steel division, as the only source of complete information on the overall picture, might possibly be able to reroute the order to another mill.

Naval rocket requirements by December, 1945, were expected to mushroom to 33 times the December, 1944, requirements, a Naval official reported. V-E day would have no deflationary effect on this program, he stated. The Rocket program, plus expanding shell-steel requirements, will have their greatest impact on special alloy steels and carbon hot topped steels, respectively, Steel Division spokesmen said. Plans are under way to increase hot topping facilities, WPB spokesmen reported. Increased sheet production was expected to result from greater use of strip mills while some interchange of semi-finished steel to utilize fully finishing capacities was also contributing to some increase in overall production.

## COMING EVENTS

April 4-6—SAE National Aeronautic Meeting, New York.
April 12-14—Electrochemical Society, Inc., Philadelphia—Atlantic City Congress, Atlantic City, N. J.

CANCELLED

March 19-22—American Society of Tool Engineers, Cleveland.
April—American Zinc Institute, St. Louis.
April 26-27—Annual Conference, Open-Hearth Steel Committee and Blast Furnace and Raw Materials Committee, Iron and Steel Division, A.I.M.E., Chicago.
April 30—May 4—American Foundrymen's Association, Detroit.
May—American Gear Manufacturers Association, general meeting.
May—General Meeting, American Iron & Steel Institute, New York.
American Steel Warehouse Association, 1945 Convention, New York.

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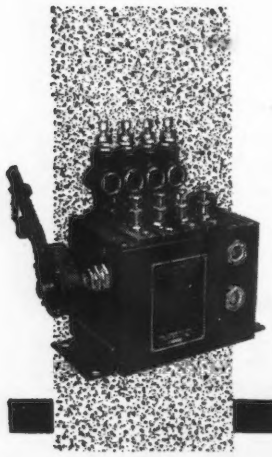

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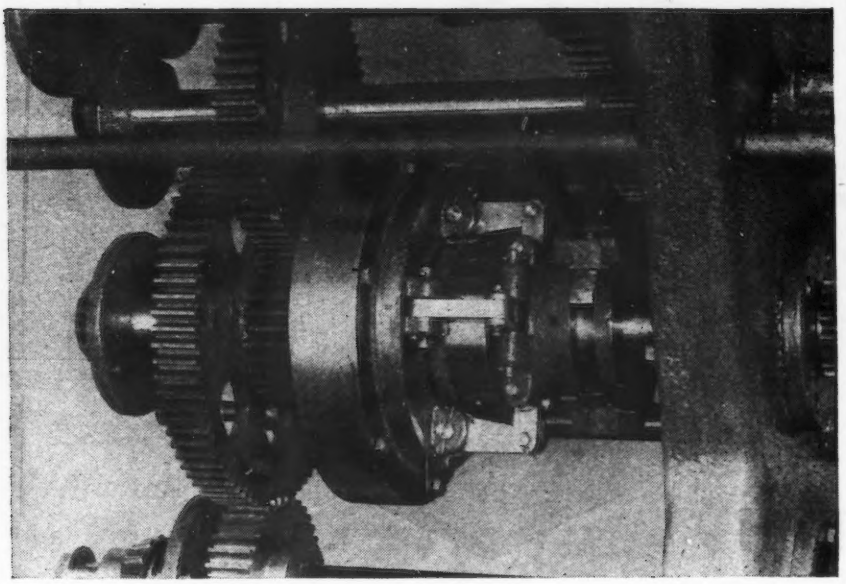

**HELPS TO GREATER ACCURACY** *in Spring Coiling*

**No. 13 Clutch Adjustments (Clutch Type Coiler)**

Adjustment of the friction clutch must be made occasionally, and is easily done by inserting a pin in the clutch adjustment ring and turning the ring one notch or more as required. Clutch should never be tightened beyond the point where the clutch operating lever cannot be pried off and on manually with a screw driver inserted against the clutch operating cams. This is a good way to check whether there is strain in the clutch and lever due to excessive tightening of the clutch.

The clutch arm link should be approximately 1/32" beyond the vertical position when the clutch is engaged. The clutch adjustment ring automatically corrects the position of the clutch arm link, except on the W-24 and W-25. On those the clutch spider is adjustable.

Clutch friction discs are easily replaced by removing screws holding the clutch plate to the clutch body. The clutch plate is made in two parts and will slide out when screws are removed.

April 19th—*Torsion Spring Attachment*

THE TORRINGTON
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## Group Announces The Acquisition of Stock Of Firth-Sterling Co.

***New York***

• • • **Headed by Lehman Brothers,** a group of private investors is buying a majority of the common stock outstanding of the Firth-Sterling Steel Co. of McKeesport, Pa., it was announced recently. The reported price is $3,000,000 plus. It is also understood that the bankers are also negotiating for purchase of additional shares in behalf of their group from other stockholders.

It is understood that Lehman Brothers is acting primarily as an intermediary only in the acquisition of the stock. The latter is being sold to several individuals and two institutions. It is also understood on good authority that the stipulation was made that the purchasers would retain the stock for at least one year before disposal. The question of merging with other companies was not involved in this transaction.

The group has arranged to purchase the majority holdings from the English steelmakers Thomas Firth & John Brown, Ltd., of Sheffield and other British stockholders.

L. Gerard Firth, president of the company, which manufactures tool, dies and cutlery steels and sintered carbides, reported that production of the company would be expanded but that the active management and policies would continue unchanged. The buying group will be represented on the board of directors soon.

## Foreign Contracts Under Negotiation

***Cleveland***

• • • **Arthur G. McKee & Co.** report a satisfactory volume of foreign and domestic contracts has been received during the first two months of 1945. A large volume of foreign contracts are under negotiation and discussion, but with little likelihood that they can be converted to contracts until the end of the European War since materials and manpower are not presently available to allow them to proceed.

The company reports that its work in Brazil is substantially completed. Good progress is now being made on the various oil refinery and pipe line projects on which the company is now engaged in Mexico.

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Rochelle Salt
Sodium Bisulphite
Sodium Carbonate (Sal Soda)
Sodium Hydroxide (Caustic Soda)
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## *Maritime Building Largely Converted To Victory Vessels*

***New York***

• • • **Production of large merchant ships over 2,000 gross tons in 1944 reached a total of 1,463 vessels of 11,403,163 gross tons and 16,143,065 deadweight tons, according to a report made by J. L. Luckenbach, president of the American Bureaus of Shipping to managers and members of the organization.**

**In his report, Mr. Luckenbach stated that, this did not measure up to the record year of 1943, when 2,300,000 deadweight tons more were produced. However, merchant ship completions averaged four every day in the year, and three and one-half days since we entered the war. The record construction rate of merchant vessels achieved during 1943 would have been duplicated in 1944 were it not for the curbing of overtime labor and the transition from Liberty ship building to Victory ship construction. However, American shipyards in 1944 did have a record year from a production standpoint, as in addition to merchant ship construction, 39,971 units, mostly landing craft, were completed for the Navy, and hundreds of small vessels for the Army, Coast Guard and the Defense Plant Corporation.**

**The vessels produced in 1944 were constructed by 38 of our major shipyards, two of the yards finishing more than 100 ships each — actually one every three days. A number of our older established shipyards are still engaged exclusively upon naval construction and did not contribute to the large volume of merchant shipbuilding.**

**Since September, 1939, we have produced a new merchant fleet nearly the equal of the prewar world tonnage from a performance and operation standpoint, totaling 4,009 units of 30,576,606 gross tons and 44,442,165 deadweight tons. There will be added to this total by the end of 1945 approximately 1,200 vessels of about 9,300,000 gross tons and 13,000,000 deadweight tons. We have already created a fleet four times larger than existed under the American flag in 1939 and by the end of 1945 it will be five times larger.**

**Mr. Luckenbach continued that "of the total of 1,463 merchant vessels constructed in 1944, 1,223 were of the cargo or combination passenger and cargo types, representing 8,916,766 gross tons and 12,188,108 dead-**

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If you believe that your company may have an application for sulphite-treated steels, our sales and metallurgical staffs are at your service. We have accomplished satisfactory results for others and are ready to serve you in the same way.

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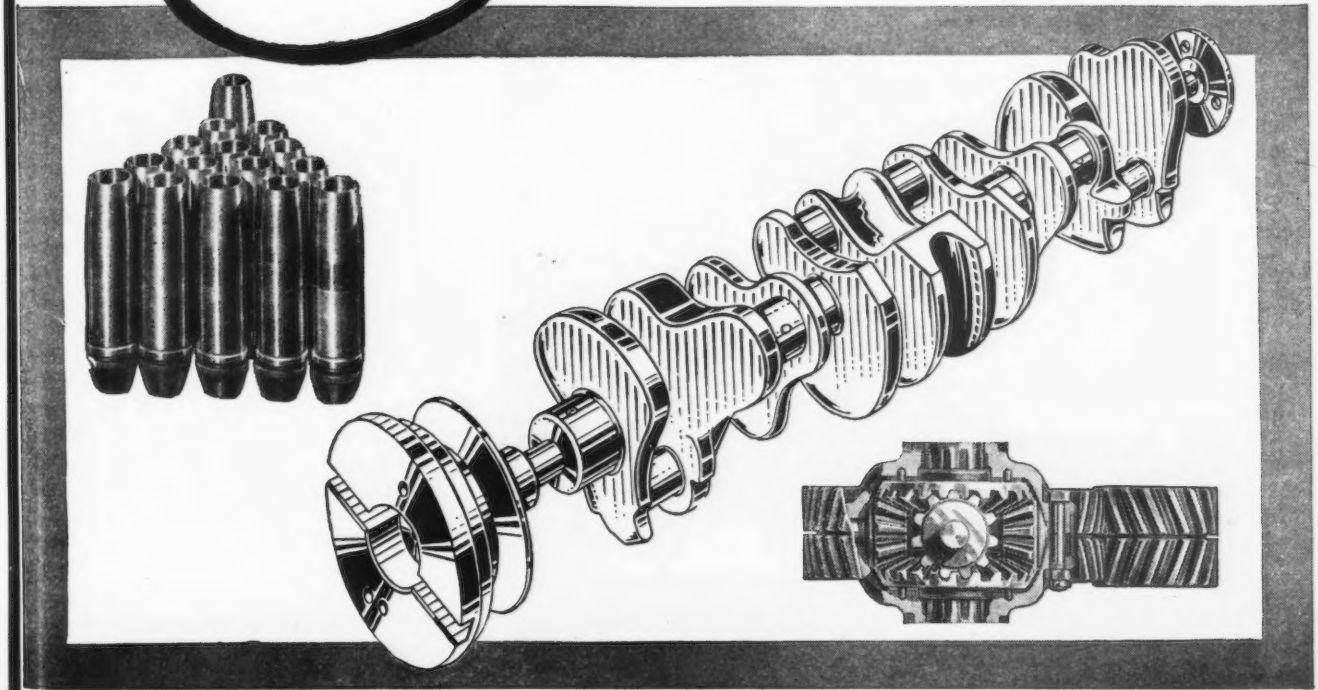
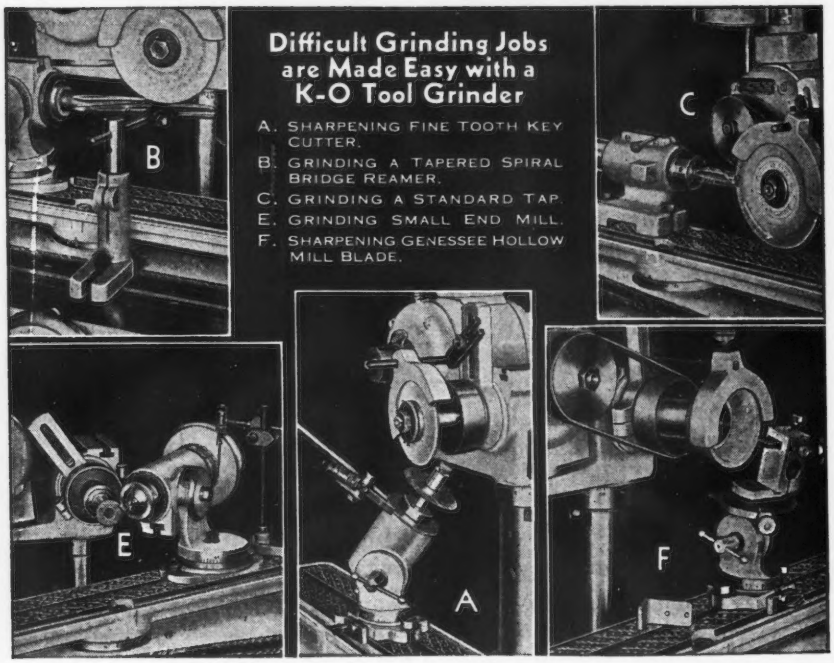


Cutting Tools Must Be Conditioned for Post War Production, Too!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## Not All Men and Machines Can Be Released When the War Ends... Some Must Stay on the Job!

When the war broke out, *Knock-Out* Tool Grinders were ready! They've been doing a Titan's job on production work and on tool maintenance throughout the nation and all allied countries. Now as the peace approaches, and thinking men are readying their plants for the tremendous production job which lies ahead, *Knock-Out* Grinders are again ready to accept the challenge!

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weight tons. While a majority of the vessels in this category were Liberty emergency cargo ships, totaling 722 with a deadweight tonnage of 7,679,113 tons, Victory ships also came into production during the year in shipyards which had completed their Liberty ship contracts. A total of 209 vessels of the Victory design were completed, having a deadweight tonnage of about 2,000,000 tons. This type of vessel is now being built by six shipyards, and some have been constructed in 59 days.

"The Liberty ship building program is nearing completion, with 148 still scheduled as of January 1st—24 of which are being completed as colliers. A total of 2,504 Liberty ships have been completed in an average time of 62 days each and 62 Liberty ships were completed as tankers. Several shipyards have completed their Liberty ships contracts with average building times of 41 to 45 days. These ships are now being built only on the Atlantic and Gulf Coasts, as the Pacific Coast programs were completed," acording to Mr. Luckenbach.

"The shipbuilding industry of the United States established a new record in 1944 by installing in merchant vessels a greater horsepower than was ever produced in one year. The main contributing reason for this new achievement was the transition from Liberty to Victory shipbuilding, involving three times greater horsepower per vessel. A total of 7,448,950 horsepower of main propelling machinery was installed in 1,463 seagoing merchant ships.

"A significant feature of the wartime shipbuilding program in the United States has been the utilization of internal combustion engines on a vast and unprecedented scale for the propulsion of many varied types of small vessels. The United States Navy had in operation at the end of 1944 approximately 32,000,000 horsepower of Diesel engines. The prewar seagoing merchant marine of the United States had only 300,000 horsepower of Diesel engines.

While these naval units were mainly special types of landing vessels, a number of larger installations do exist. Many varied types of Diesels are now available in the United States and the horsepower of the individual unit is being increased as a result of experience, while the weight per horsepower is being decreased. However, where larger horsepowers are concerned, steam greatly predominates.

"As in 1942 and 1943, Pacific coast

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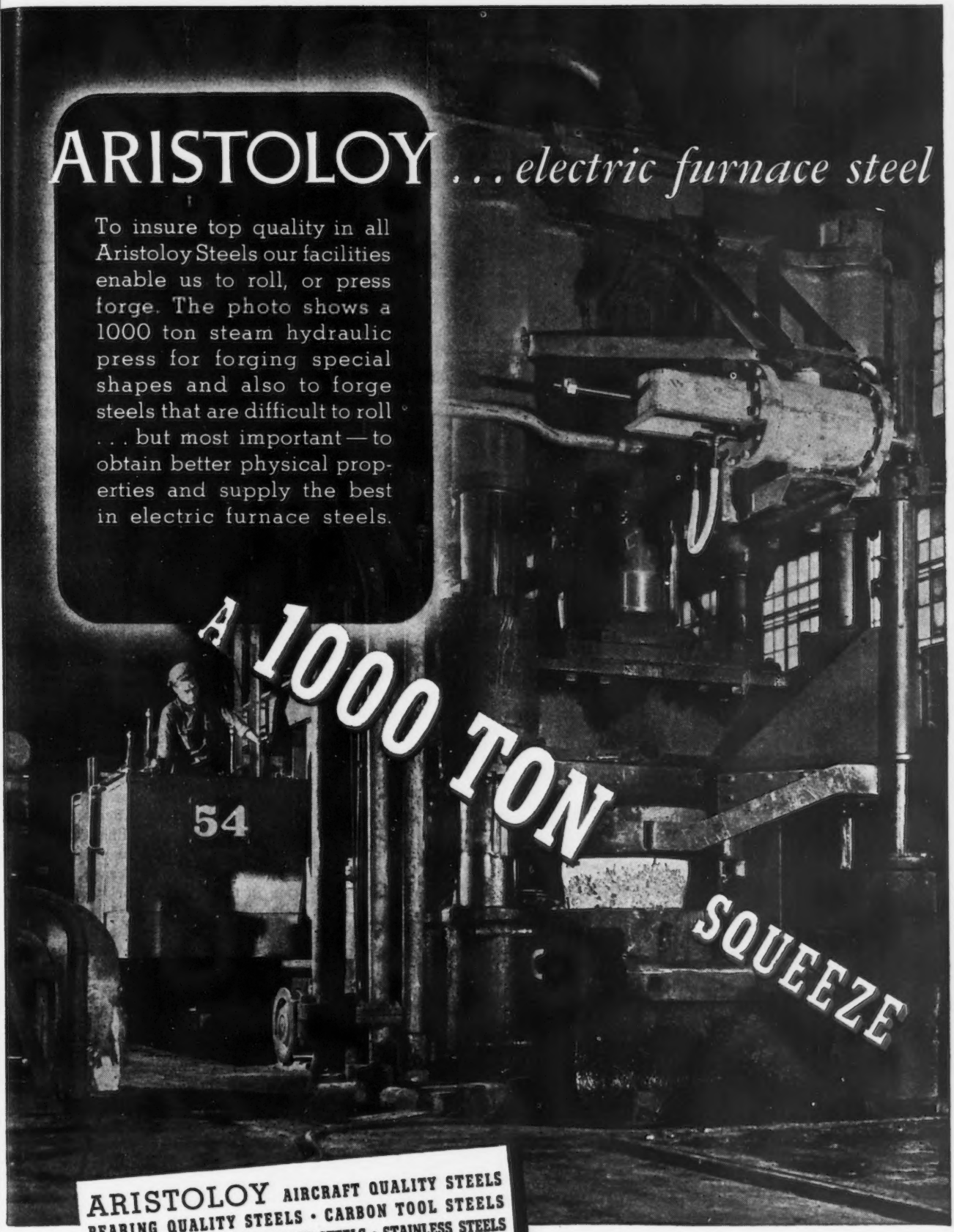


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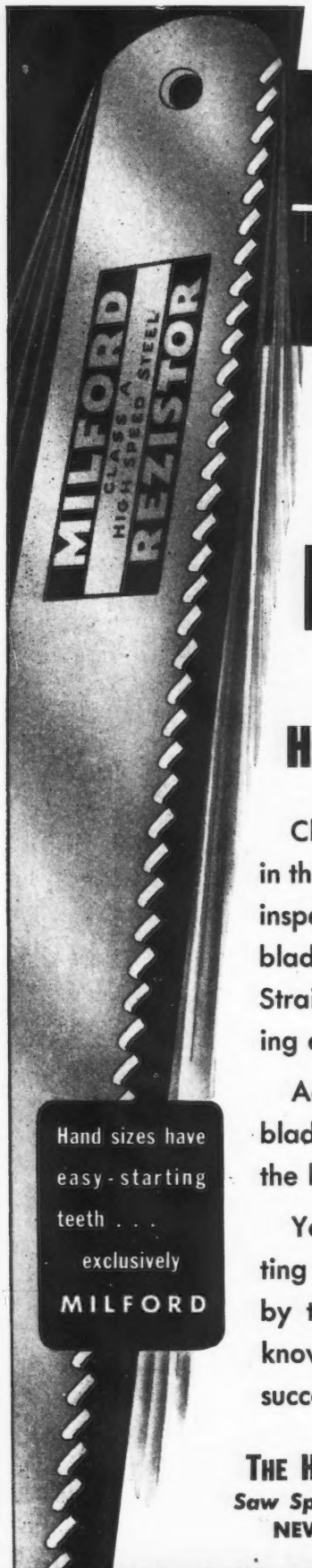


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Also manufacturers of MILFORD Profile Saw . . . first choice in narrow blades for all contour and profile band saw machines.



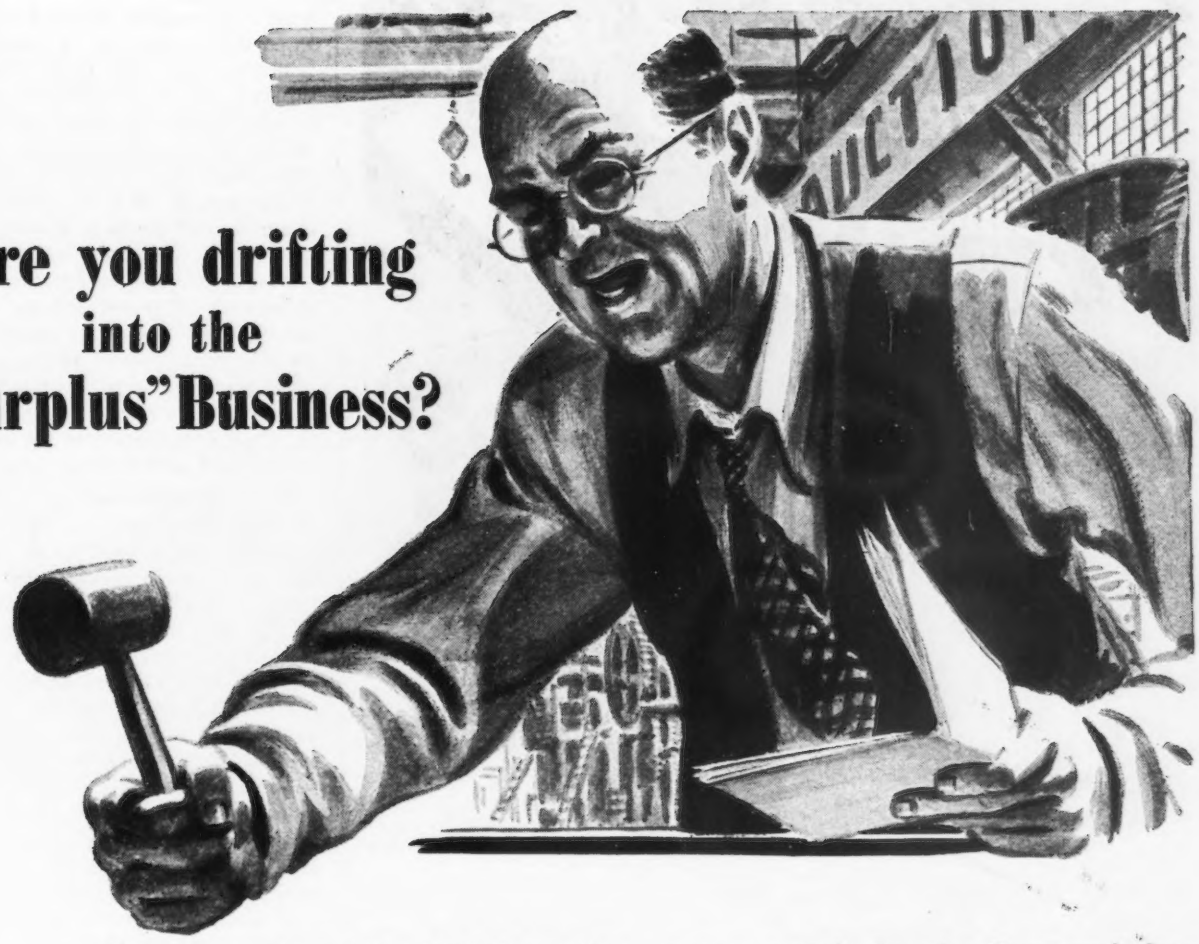

shipyards completed the greatest number and tonnage of merchant vessels, finishing 576 with a gross tonnage of 4,579,689 tons. Atlantic coast yards delivered 572 ships of 4,554,601 gross tons, while on the Gulf 287 vessels of 2,162,333 gross tons were turned out. Great Lakes yards finished, in addition to numerous smaller vessels, 24 merchant ships of 106,540 gross tons.

"The structural troubles of some of our welded ships were also discussed in the report, which stated that the general picture is somewhat brighter than at this time last year. The failures experienced in service are said to vary in degree from minor cracks which can be readily repaired and which are no more serious than a few leaky rivets to extensive plate fractures which propagate suddenly and which may result in a dangerous loss of strength to the entire structure. The report states that the fact that no serious failures occurred last year in the period between April 1 to November 1 is not surprising as it is under the heavy weather and low temperature conditions associated with the winter season that such troubles would naturally be expected.

"Mr. Luckenbach continued that, some welded ships seem to have critical spots from which fractures start for no obvious reason and from a source which would normally be considered of no great significance. Experience and expediency have dictated the use of the more flexible riveted attachment in longitudinal seams and gunwale connections in order to provide barriers against crack propagation in those particular types of vessels which experience has shown to be particularly susceptible to trouble. The corrective measures undertaken along these lines on our later Liberty ships during construction and being applied to such ships in service as rapidly as opportunity affords appear to be quite effective. In this connection the comparative immunity from structural troubles as evidenced by our records on those particular welded ships where the longitudinal side shell seams are riveted is worthy of note.

"Describing the research work now in progress at various laboratories throughout the country to solve welding problems, the bureau president pointed out that the studies are largely financed by the Government and under the control of Advisory Committees on most of which the bureau is represented.

"A number of committee meetings have been held so that the technical

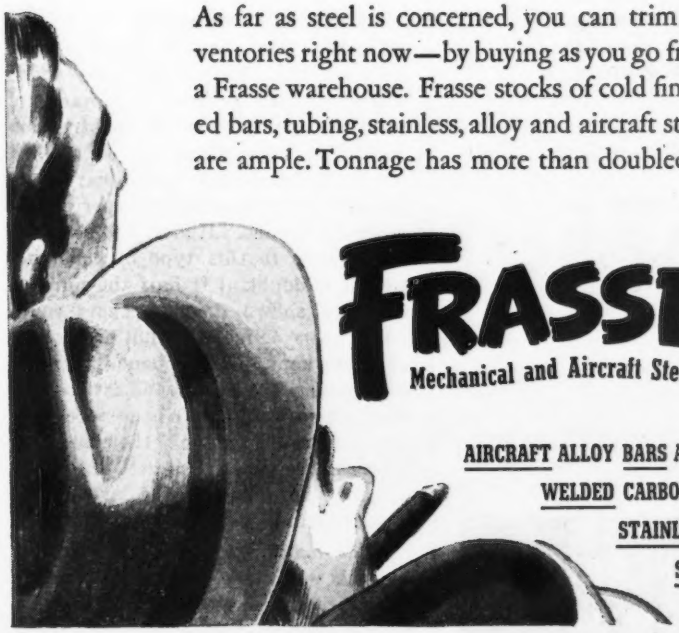


# Are you drifting into the "Surplus" Business?

It has been estimated that $20 billions of surplus material will require disposal at the war's end. How will your postwar time and energy be spent — in production, or in the "surplus" business?

As far as steel is concerned, you can trim inventories right now — by buying as you go from a Frasse warehouse. Frasse stocks of cold finished bars, tubing, stainless, alloy and aircraft steels are ample. Tonnage has more than doubled to serve war needs. By using Frasse stocks, you maintain war production, but keep your inventory low — escape dead surplus when cancellations and cutbacks occur.

No need to pile up your "surplus problem" with Frasse steels handy . . . mechanical and aircraft grades in extensive size and shape ranges are readily available. To keep up production . . . keep down the surplus risk . . . call Frasse first.



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Mechanical and Aircraft Steels

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WELDED CARBON AND ALLOY TUBING • SEAMLESS PIPE AND CONDENSER TUBING
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Engineered to give maximum production with economy.

Thomastrip Precoated is designed to give manufacturers a metal with functional, corrosion resisting, heat treating and decorative benefits. Suitable coatings can be furnished for brazing, drawing, soldering, welding, tinning or further plating.

Due to long experience in the production and application of coated steel, Thomas is prepared to offer assistance in the use of these products for a variety of manufactured parts. Remember, too, that Thomas controls the base steel, a further guarantee that the coated material is of the highest possible quality.

Thomas precoated strip steel warrants your investigation. We invite your inquiry.

ELECTRO-COATED ZINC, COPPER, NICKEL AND BRASS . . . HOT DIPPED TIN AND SOLDER . . . LACQUER COATED IN COLORS . . . UNCOATED PRECISION STRIP, CARBON AND ALLOY SPECIALTIES.

THE THOMAS STEEL CO. • WARREN, OHIO

COLD ROLLED STRIP STEEL SPECIALISTS




staff is thoroughly familiar with these important activities. Valuable work is also being done by some of our shipbuilders and steel manufacturers and it would certainly appear as if every avenue of research is being explored. The projects comprise the taking of strain gauge measurements and the evaluation of stress in the sub-assemblies and completed assemblies of welded ships, also on ships in service. A number of investigations into the behavior of the steel itself under varying conditions of stress and temperature have been initiated in an endeavor to solve the problem of brittle crack propagation in the comparatively rigid welded structure.

"Fundamental investigations of this character progress step by step, one project usually leading to another, and such work cannot be unduly rushed if the danger of drawing premature and unwarranted conclusions is to be avoided. Investigations carried out with the limited facilities in our own laboratory, together with our analysis of service failures, point to the need for a commercial steel more suitable for use in welded structures having higher notch impact values especially at low temperatures than the ordinary structural steel now available. The accumulative data resulting from the various research projects when correlated and analyzed will undoubtedly have a beneficial effect on future welded ship construction. Sound workmanship and suitable design will, however, continue to be essential considerations for the production of satisfactory welded ships.

"While the transition from the riveted to the welded ship has been gradual the change has been accelerated by the demands of war and such a new method of construction could not be expected to be applied on such a huge scale under war emergency conditions without experiencing some difficulties. Had it not been for the change to this type of construction it is doubtful if half the number of ships shown in this report could have been delivered, and even half of those kept in continuous operation considering the additional drydocking time which would have been necessary for the re-driving of thousands of rivets if the experience with the riveted ships built during the last war is any criterion.

"The making of a riveter requires months, whereas a welder can be made in relatively short time. Besides, a riveter through the nature of his work must be of rugged physique. Women

# From PSF Foundry Sand . . .

## TO THE SANDS OF *The Seven Seas!*

Anchors of all sizes (those illustrated are 6000-pounders) have been one of our war assignments. Big ones or little ones, we know they'll hold, because they have the advantageous grain structure, sound texture, dependable strength and faithfulness to specification that you can always count on in PSF castings. Technique, equipment, experience—they're the reasons why.

W&D 9466

47 YEARS OF STEEL CASTING KNOWLEDGE

*Pittsburgh*

**STEEL FOUNDRY CORPORATION**

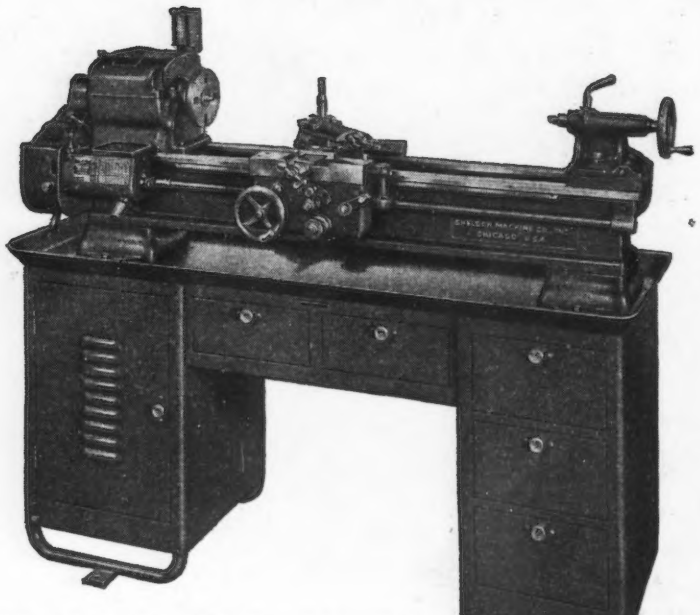
**GLASSPORT, PA.**

*Sales Offices:* NEW YORK • PHILADELPHIA • WASHINGTON AND CHICAGO

*If it's a small part*

*. . . turn it with Precision, Speed and Profit*

*on a* **SHELDON LATHE**



**Model S-56 10″ Precision Lathe**

Engineered for precision shop and tool room work. Rigidly built to stand up and hold its close accuracy under round-the-clock operation. This is a quality machine tool in every detail, yet is moderate in price . . . a lathe that stands out far ahead of others. (The lathe selected by U. S. Army, the Navy and the Marine Corps for mechanized machine shop instrument repair shops, etc.)

Contact us or your local Sheldon dealer for prices, engineering data, deliveries, etc.

**All SHELDON lead screws are cut on the finest Pratt and Whitney "Super-precision" lead screw machine.**

- **Bronze or anti-friction bearings**
- **"1" Collet capacity**
- **11¼-inch swing**
- **Double-walled apron**
- **Large hardened and ground spindle**
- **Extreme accuracy**
- **Convenient controls**
- **Underneath V-belt motor drive**
- **All Steel Bench**

**SHELDON MACHINE CO., Inc., 4210 N. Knox Ave., CHICAGO 41, U.S.A.**

*BUILDERS of GOOD LATHES since 1919.*



are used in many of the yards for welding. Few women could be used as riveters.

"While there has been a marked simplification of design details because of the use of welding and a considerable progress in shipbuilding methods through an extended use of fabrication methods, the fact that so many ships were built of the same design in different types might prompt the wrong conclusion regarding developments in naval architecture. In marine engineering, necessity has demanded the use of types of machinery which could be most readily manufactured. It has also required the use of alternative materials. Until experience in the use of the alternative materials has been gained, no accurate judgment can be placed on them.

"Expediency has not permitted much in the way of development of the large internal combustion engine. However, tremendous development of this type of machinery in single units up to about 2,000 horsepower has been the outgrowth. Geared turbine and turbo electric, together with some reciprocating engines of varying types, have been called in to play a part and developments in higher steam pressures and gas turbines may be looked for.

"Such experimental and research work has been done and until these are brought out into the light after the war it would be difficult to predict what we might expect. However, it is safe to say that substantial strides will be made both in material and construction which will be beneficial to the design, navigation and operation of ships.

## Continental Income Declines

*Chicago*

• • • Although sales of Continental Steel Corp., Kokomo, Ind., totaled $22,474,066 during 1944 compared to $22,264,078 during the previous year, net profit dropped from $762,609 to $508,660.

The drop in earnings was more than accounted for by provision for additional cost due to the Nov. 25, 1944, decision of the War Labor Board granting wage adjustments. The company estimated that its total cost for the items of shift differentials and additional vacation benefits would be $262,600. No provision was made for other portions of the grant, existence of intraplant inequities being doubted, and other provisions being subject to definition.

Dust, uncontrolled in your plant, is many times more harmful to your equipment and production than it is to the human eye. Why doctor dust-damaged equipment when the cause of the damage can be checked at its source? An American Dustube engineer can quickly show you how to eliminate the costly penalties dust inflicts. He can quickly show how American Dustube Collectors efficiently trap and effect its safe, easy disposal. There is an American Dustube dust collector of a size and type to handle the dust problem that exists in your plant. The last word in improved design, Dustube offers you many advantages through efficient operation, easy installation and inspection. Fewer working parts create a minimum of maintenance.

Improper shakeout is a prime reason for dust collector failure. The diagram "A" demonstrates the efficient Dustube shakeout method. Tubes are limp and deflated, completely subject to the shaking action. Dust is not precipitated on other filters, but is deposited directly into the hopper below. With Dustubes, shakeout periods are shorter and less frequent . . . filter tube wear is decreased.

Figure "B". Dustube Collectors filter air at a rate from 270 CFM to 47,000 CFM and more, depending on the dust problem. Proved collection efficiency by weight is 98% or more.

Figure A

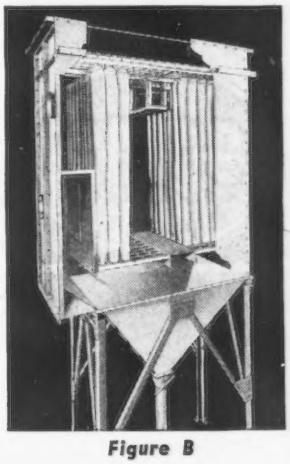


Figure B

**AMERICAN**
**FOUNDRY EQUIPMENT CO.**
**510 South Byrkit Street**
**Mishawaka, Indiana**

ARMY E NAVY

**AMERICAN dustube**
*dust collectors*

# TURNER PLAST-O-LOCK

(Patent Applied For)

## GAUGE SAYS STOP

## on its NOT GO member!

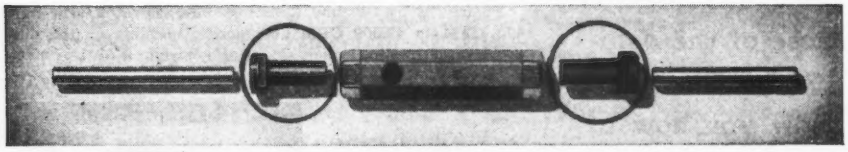
Here's another first by Turner—a *red* plastic collet to more quickly identify the "not go" member of your plug gauges! Plast-O-Lock gauges are great time savers wherever they are used.

Turner's Plast-O-Lock (patent applied for) collet type plug gauges are not only easier to use but they will multiply the life of plug gauges many times. The reason for this is obvious. Because Plast-O-Lock features a collet of plastic, slotted and tapered to fit into the tapered end of a standard plastic handle, it is possible for the gauges to be held securely without their surfaces being scratched or burred, thereby allowing use of most of the gauge's length. For example, as the "go" and "not go" ends are worn beyond allowed tolerances they are simply cut off, thus leaving an unused end ready for gauging. To illustrate further, if a boring no deeper than 1/8" is being checked, as many as 8 fresh gauging sections may be obtained from one standard length "go" gauge as furnished with Turner's Plast-O-Lock. This obviously eliminates the necessity of salvaging used gauges.

For full particulars about Plast-O-Lock gauges wire or write us today.

★ Features ★

1. Multiplies the life of the plug gage.
2. Collet will not mar a lapped or polished surface.
3. Used with plastic handle the gauge has a more sensitive feel in the hands of an inspector.
4. Is easy to make length adjustment because slot is provided for end wrench.
5. Plast-O-Lock size range from .050 to .690.
6. Red plastic collet for quick identification of "not go" members.

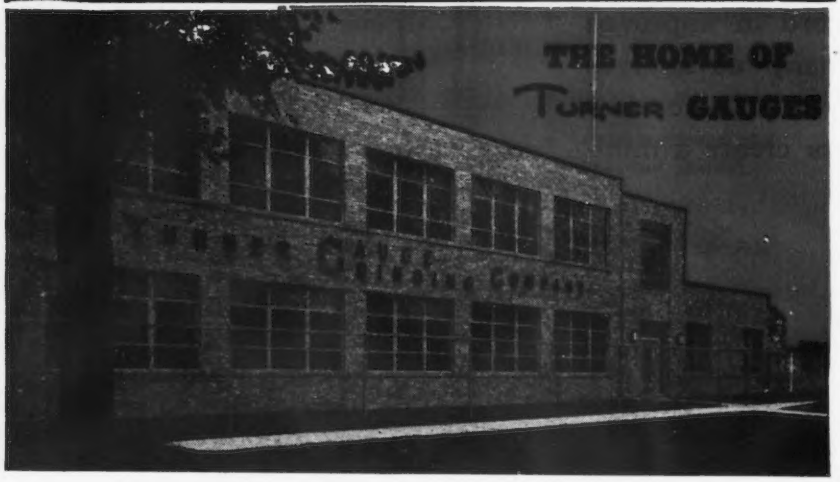


**DELIVERY** Fast delivery can be made on these Plast-O-Lock gauges as well as the following Turner gauges: ring, flush pin, snap and built up.

TURNER BROTHERS

TURNER GAUGE GRINDING COMPANY

2625 HILTON ROAD • • • • FERNDALE, MICH.







## Newest Termination Order on Overstating Claims for Financing

***Washington***

• • • Director of Contract Settlement Robert H. Hinckley last week issued Regulation 13, dealing with the suspension or modification of the penalty for overstating claims in connection with interim financing for holders of terminated contracts. The regulation is designed to facilitate adequate interim financing. It delegates the authority to modify or suspend the penalty to the heads of the contracting agencies and prescribes standards under which the penalty may be waived.

Based on the premise that the penalty for overstatement should be suspended unless there is bad faith on the contractor's part, or unless he secures an overpayment, the regulation, referring to partial payment applications states: "The penalty would be inequitable if greater than, and should be reduced to, 6 per cent of the amount by which the total partial payments made to the war contractor on account of his own termination claim exceed the amount of the final settlement of that claim."

Where the overstatement is made by a war contractor in connection with a loan made or guaranteed by the government, or a request for a partial payment to enable the contractor to establish a fund for the payment of subcontractors, or in connection with an application for a controlled partial payment, the penalty is to be waived unless the overstatement was made in bad faith.

## Receives Large Number Of Diesel Generator Set Orders for Army

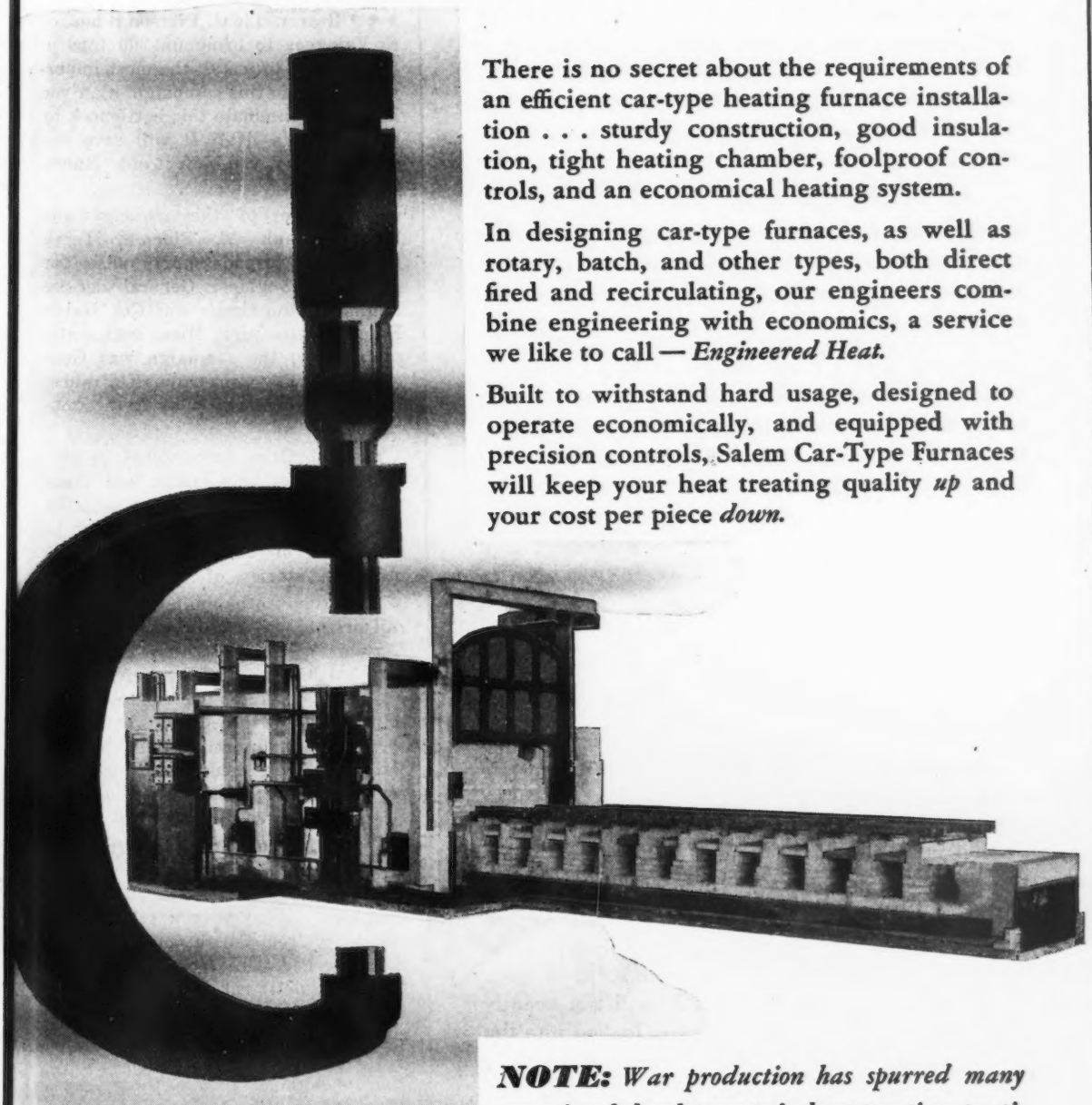
***Cleveland***

• • • Orders for a large number of portable diesel generator sets, mounted on skids, for use by U. S. Army engineers in supplying power to war-devastated cities, have been received by the Cleveland Diesel Engine Division of General Motors Corp., according to an announcement made this week by George W. Codrington, General Motors vice president in charge of this division.

While the exact number of units ordered was not revealed, Mr. Codrington intimated that the contract was one of the largest ever placed for this type of power producing equipment.

LEM APPLIES *Engineered Heat*

## TO CAR-TYPE FURNACES



There is no secret about the requirements of an efficient car-type heating furnace installation . . . sturdy construction, good insulation, tight heating chamber, foolproof controls, and an economical heating system.

In designing car-type furnaces, as well as rotary, batch, and other types, both direct fired and recirculating, our engineers combine engineering with economics, a service we like to call — *Engineered Heat.*

Built to withstand hard usage, designed to operate economically, and equipped with precision controls, Salem Car-Type Furnaces will keep your heat treating quality *up* and your cost per piece *down.*

alem builds all sizes and types of car-type urnaces, for gas, oil, or electric, direct red or recirculating. Salem is the exclusive uilder of circular ingot heating furnaces.

***NOTE:*** *War production has spurred many sensational developments in heat treating, particularly in controls, quenching and fitting the parts to the method. Salem engineers will be glad to discuss these advances with you.*

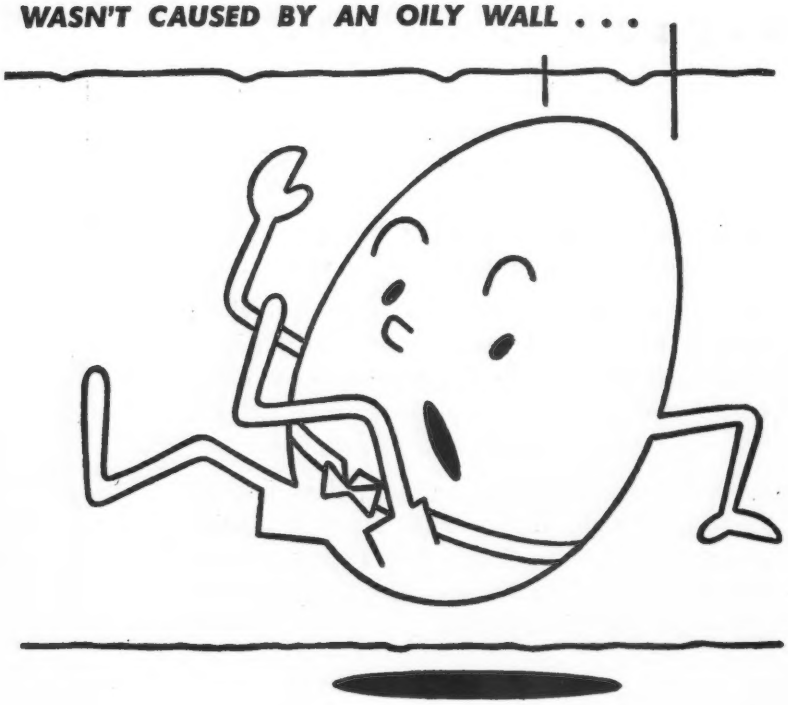
SALEM **SALEM** OHIO

ENGINEERING CO.

SALEM ENGINEERING COMPANY

FAMOUS FALLS No. 1

**HUMPTY-DUMPTY'S FAMOUS FALL**
**WASN'T CAUSED BY AN OILY WALL . . .**



**BUT** many a serious fall in industry *is* caused by oil on the floors. It's SPEEDI-DRI's business to stop those falls — and SPEEDI-DRI knows its business better than anything else ever devised for the purpose.

You simply spread this white, granular, skid-proof material on the floor and *immediately* it begins to soak up oil and grease like a blotter absorbs ink. No need for expensive cleaning machines, dangerous solvents and caustics, or excessive porter-labor. Just sweep it up (without interrupting production) and your floor will be clean and dry.

Thousands of war-busy plants are using SPEEDI-DRI to step-up production by making workers more sure-footed, to improve labor relations, to save money on cleaning costs, to reduce accident rates. Leading insurance companies recommend it. It will not readily burn even when oil-soaked. Isn't it about time you looked into the possibilities of this product for *your* plant? Write today for generous, free sample.

*SUPPLIERS: East* — Refiners Lubricating Co., New York 1, New York.
*Midwest & South* — Waverly Petroleum Products Co., Philadelphia 6, Pa.
*West Coast* — Waverly Petroleum Products Co., Russ Bldg., San Francisco 4, Calif.

**SPEEDI-DRI**
**OIL AND GREASE ABSORBENT**



## *Seine Bridge Job Is Patchwork By American Engineers*

***Advance United States Supply Headquarters in Belgium***

• • • **Bearer, Lieut. Pierson** is headed to Valognes to bring up 300 tons of bridge steel to install the most important bridge in this campaign. Can you help us to eliminate this bottleneck by giving him a lift? It will save one day. Anyway, you blew it out. Hulen, Col."

The bearer of this message was Lieut. Frank M. Pierson, Terra Haute, Ind., brigade supply officer for the 374th Engineer General Service Regiment; the signer was Col. Harry Hulen, Hattiesburg, Miss., regimental commander; the campaign was General Patton's rush through France; the address was any pilot on the Continent.

The difficulties encountered in getting steel for this bridge and those which faced the men who actually completed the bridge go together to make one of the outstanding construction stories of the war.

The bridge to be built was the first rail bridge across the Seine after the German withdrawal from Paris. It was at Juvisy, 15 min. drive from the Arc de Triomphe. Demolished first of all by the Allied Air Forces the bridge had been rebuilt by the Germans, then demolished by them as General Patton rushed toward Paris.

At Juvisy the Seine is 500 ft. wide. Two 120 ft. spans had been blown. The first span at the east abutment had been cut so that wreckage was suspended from the abutment down to the river bed. The second span from the west abutment had been cut so that it hung from an intermediate river pier to the river bottom.

The engineers didn't have steel long enough to bridge these gaps. They had to place two new piers and lay four 60 Unit Construction Railroad Bridges, British designed prefabricated structures, across the space thus formed.

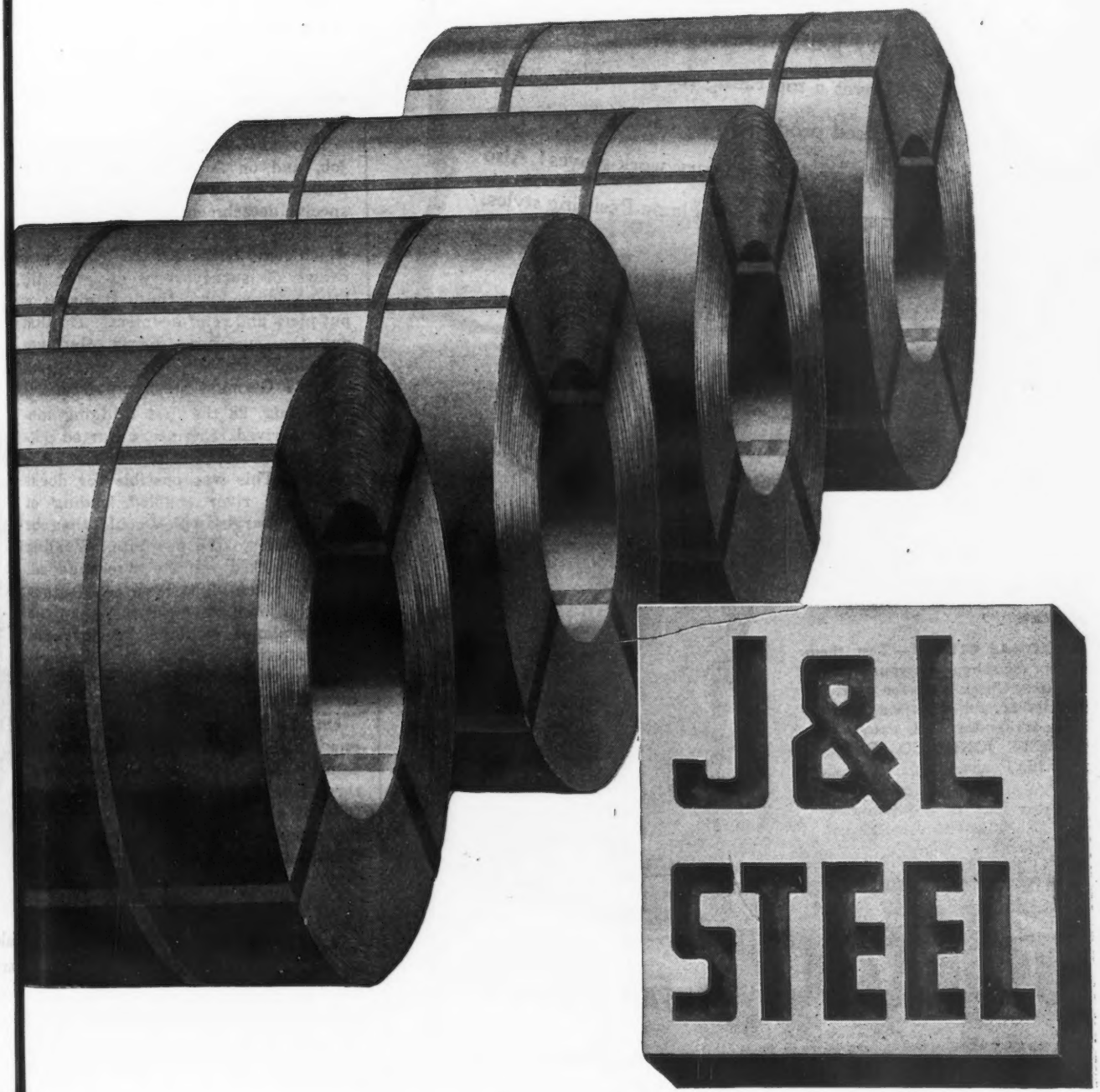
Lieutenant Pierson finally hitched two plane rides which placed him in a pasture next to the depot where he was to pick up the material and get it loaded on trucks which had left for the depot two days before he started his trip.

He found only two of the British type, and these lacked end posts, large steel posts which support the

J&L CONTROLLED QUALITY

# SHEETS

*Uniformity—coil after coil—foot after foot—maintained in J&L sheets by constant tests and inspections.*




**JONES & LAUGHLIN STEEL CORPORATION**

PITTSBURGH 30, PENNSYLVANIA

# IT'S A KNACK IN OUR KNITTING

What's the secret of the remarkable JOMAC Industrial Glove Fabric? Here's the story: It is achieved on our special, pile-knitting machine . . . a loop-finished cloth girded with thousands of sturdy "cushions" to protect workers' hands on their many hot and heavy jobs. America's leading shops give JOMAC Gloves a top rating for protection, washability, increased production . . . and for giving up to 7 *times the wear* of ordinary work-gloves! Also available in special Heat- and Flame-Resisting styles.

**JOMAC'S LATEST CREATION**—Safety *GAUNTLET-CUFFS*. Now, you simply replace worn glove without the expense of buying full gauntlet.

**TRY JOMAC GLOVES**—Test them in your own shop—on your *toughest jobs*. Check them for wear, for washability, for increased production. Write for full details. C. WALKER JONES CO., Philadelphia 38, Penna.

**JOMAC** INDUSTRIAL GLOVES

*Three Types of Jomac Gloves*

- REGULAR INDUSTRIAL TYPE
- HEAT- AND FLAME-RESISTING
- SAFETY GAUNTLET-CUFFS




weight of the bridge plus that of the load crossing it. The end posts were on a train bound for Cherbourg, miles in the direction away from the bridge site. It was only after four days searching that the train was found, carrying the end posts along with the other two bridges needed.

Another shortage came in "camel's feet," a special type of bridge footing comprising an inverted-saucer-shaped base surmounted by a jack set on a swivel which fits into the base. Thirty were needed, only 15 could be found.

The operations officer decided to use the 15 camel's feet on the west pier; and then drive pilings to form a base for the east pier.

Two companies were assigned the job, and on Aug. 27 work started. Twenty-two welders, including a special detachment of 10, started to cut the wrecked steel into sections which could be hauled out by a crane. Crews of surveyors went over the bridge determining the best places to put piers and reinforcements. On that day the men captured 20 Germans who had been sniping at them. All told, 27 Germans were captured.

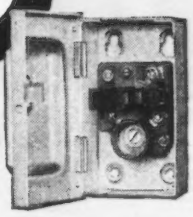
On Aug. 28 the first bridging material arrived. Engineers started putting the west pier together on the ground. This was possible for docks along the river enabled loading of the unit barges which could then be floated out to the pier site. Welding crews worked on the wreckage all day and when night came reliefs took over the job under electric lights. As enemy planes would come near the job outposts would blink messages back to the workers telling them to turn off the lights.

On the 30th assembly of the west pier was completed. The jacks on the camel's feet had been adjusted to three heights conforming to the surface of the river bed. Bracing for the camel's feet was made of 10 in. channels, three sided iron beams, and capstans for adjusting the length of the feet were improvised from 3½ in. gun barrels.

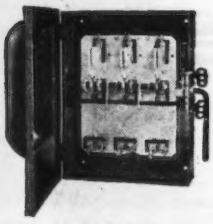
On Sept. 1 the welders had cut enough steel away from the west span to permit placing of the new pier. About one-third of the span was still in the river, but it was being pulled towards one of the intermediate river piers with winches to provide necessary clearance. Divers went down to survey the river bed at the spots where the new piers were to be put in. They found bomb craters and steel wreckage. The

# Square D's Complete Line of Safety Switches means the right switch for the job... every time!

**Type A Switches** with concealed blades. Quick make, quick break and interlocked cover. Design permits smaller boxes with plenty of wiring space. Up to 200 amperes, 600 volts. H.P. rated. Made in 2 and 3 pole, 3 and 4-wire solid neutral.

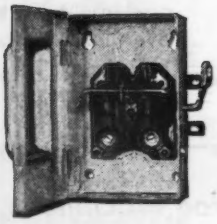


**Blue Label Line—Type D Switches** are compact, employing a rotary type of blade construction. Made for 2 pole and 2-wire and 3-wire, 230 volt A.C.-250 volt D.C. systems. Available for 30 to 60 ampere fusings. Front operated.



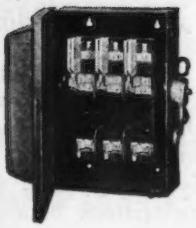
**Type A Switches** with visible blades. Quick make, quick break and interlocked cover; rated from 30 to 2400 amperes, up to 600 volts. Horsepower rated. Fusible and not fusible. 2, 3 and 4 poles and 3, 4 and 5-wire, solid neutral.

**Manual Motor Starters** are available up to 60 amperes, 575 volts A.C. horsepower rated. Auxiliary blades shunt running fuses when operating handle is moved to starting position. Releasing handle automatically moves blades to running position with fuses in circuit.



**General Purpose Switches** (Type D) are quick break only in capacities from 60 to 600 amperes inclusive. Thirty-ampere (and rain-tight) switches are not quick break. Made with 2, 3 and 4 pole and 2, 3, 4 and 5-wire s/n systems. 230 volt A.C. and 250 volt D.C.

**Double Throw Switches.** Made in sheet steel or explosion-resisting enclosures, approved for Class 1, Group D hazardous locations. Interlocked covers and quick make and quick break mechanism in sheet steel enclosures.



**Type C Industrial Safety Switches** are quick make and quick break. Made up to and including 600 amperes, 600 volt. Fusible and not fusible. Horsepower rated. 2, 3 and 4 poles, and 3, 4 and 5-wire solid neutral. Also available in rain-tight enclosures.

**Weatherproof, dust-tight and explosion-resisting enclosures** are available with ratings up to 200 amperes. Dust-tight switches approved for Class 11, Group G hazardous locations. Explosion-resisting enclosures approved for Class 1, Group D hazardous locations.

● Square D's unusually complete line of safety switches covers five divisions: *1.* Heavy Duty Industrial Type A. *2.* Intermediate Industrial Duty Type C. *3.* General Purpose Type D. *4.* Double Throw Switches. *5.* Manual Motor Starters.

See our catalog in SWEET'S or write for Safety Switch Bulletin. Address Square D Company, 6060 Rivard St., Detroit 11, Mich.

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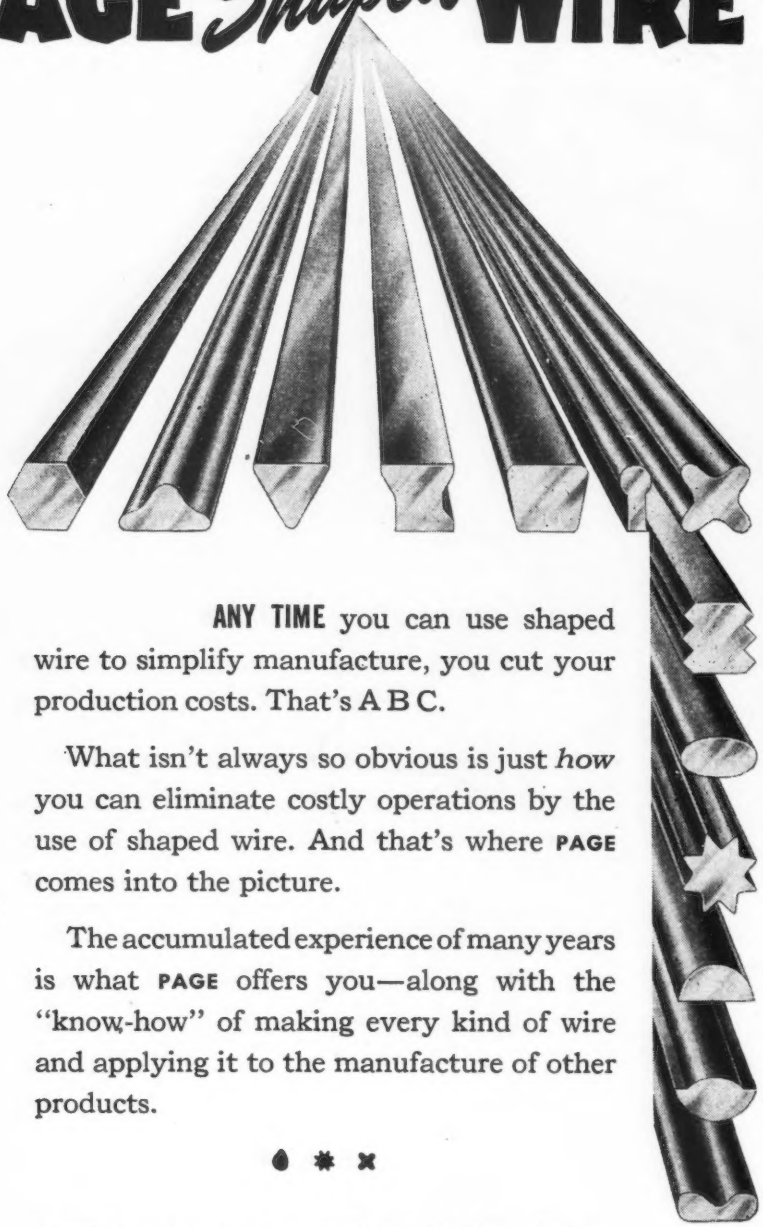
# PAGE *Shaped* WIRE



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What isn't always so obvious is just *how* you can eliminate costly operations by the use of shaped wire. And that's where **PAGE** comes into the picture.

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**PAGE** shaped wires are made in Carbon Steels, Armco Ingot Iron, Stainless Steels in end-sectional areas up to .250″ square and in widths up to ⅜ inches.

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wreckage was not removed since it was not in the way but the crate were filled in.

After the wreckage was cleared away from the piers the unit bridge were ready to be placed. Then came a problem. The French workers learned that a 60 ft. unit weighed 80 tons. The floating crane, 1850 vintage which the Americans had roused out of the Paris Port Engineer, was a 25-ton job. The French refused to take the risk. Talking fast and making figures squirm, Colonel Hulen persuaded the French that the completed span weighed only 24 tons. On the afternoon of Sept. 4 the first 60 ft. span was lifted into place, even though the bow of the crane were under water.

During the morning of the 5th the second span was placed on the west side, completing that section of the bridge. On that day also the rest of the 15 pilings was driven into place by American operators. All 15 train were capped and light steel trestling laid on top till the required height was reached. Men were now able to lay ties and rail into place on this section.

A pouring rain greeted the workers that following day. Two spans were placed to complete the east section and at exactly midnight the test train, carrying 20 over-burdened cars, started out over the bridge. The job was completed two days ahead of time.

---

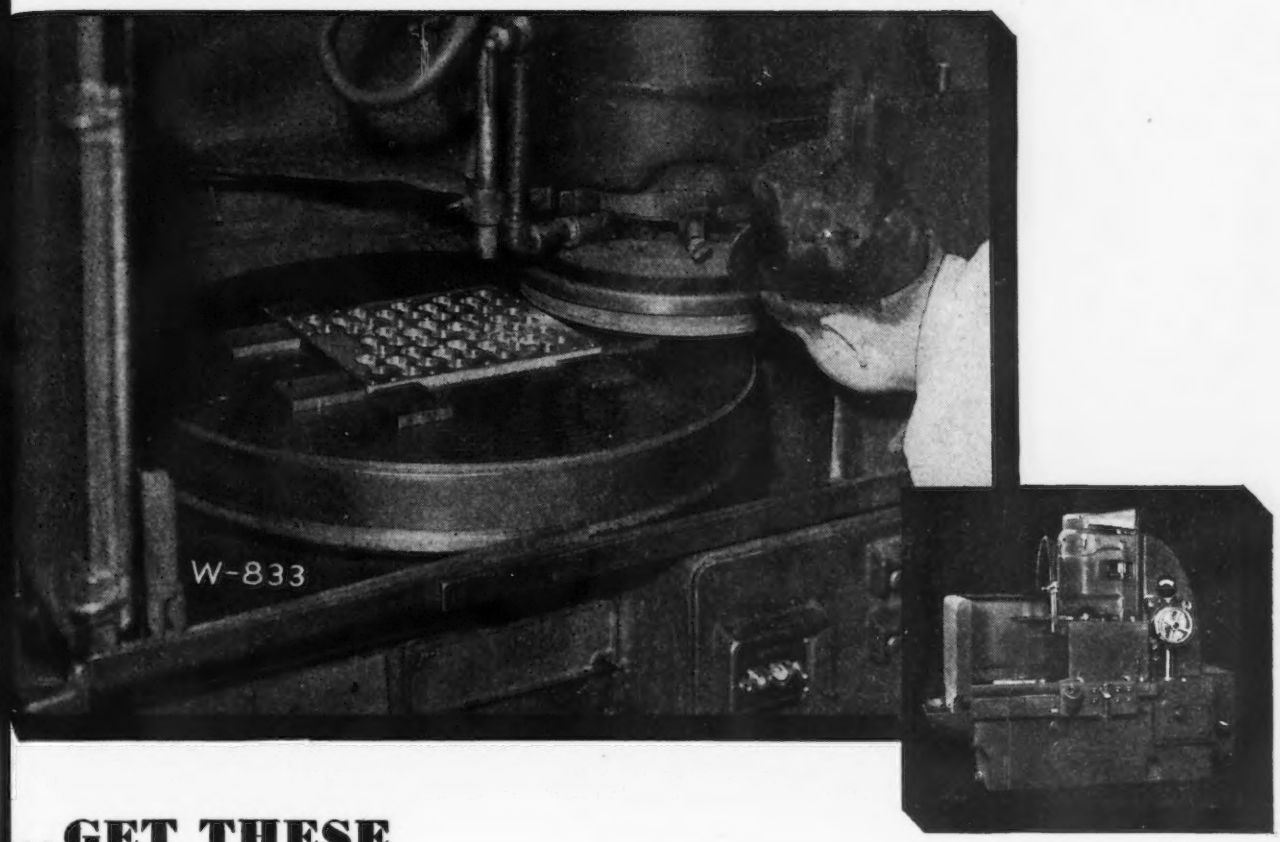
## *Construction Machines Play Large Part In Foreign Landings*

***Washington***

• • • **Machines, formerly** considered merely as earth moving equipment, have gradually taken on all the aspects of formidable weapons of war. Paced by the ubiquitous bulldozer, manned by Army engineers, construction equipment has spear-headed the landings on the Normandy coast where no landing was thought possible; has crashed through the famed Normandy hedge-rows to open up wider vistas of attack for the advancing Allied Forces; has restored the wrecked harbor of Cherbourg in record time and has worked miracles of airfield and road building.

In the Pacific, construction machinery has hewed airbases and roads out of virgin jungle with incredible

# "Put it on the Blanchard"

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These brass plates 14½" x 12⅝" x ¾" are ground on both sides to almost clean the surfaces before holes are drilled. After drilling, one side is ground flat within .003" removing .005" to .006" of stock. Production is 15 plates per hour.

The brass plate is laid on the magnetic chuck and blocked on all sides by steel pieces held magnetically. The picture shows the plate as chucked for finish grinding. In rough grinding the same setup is used with shims under the work, if needed, to prevent rocking.

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*Western Representative: F. Somers Peterson, 57 California St., San Francisco, Calif.*




speed, thus speeding up the advance to the Japanese mainland.

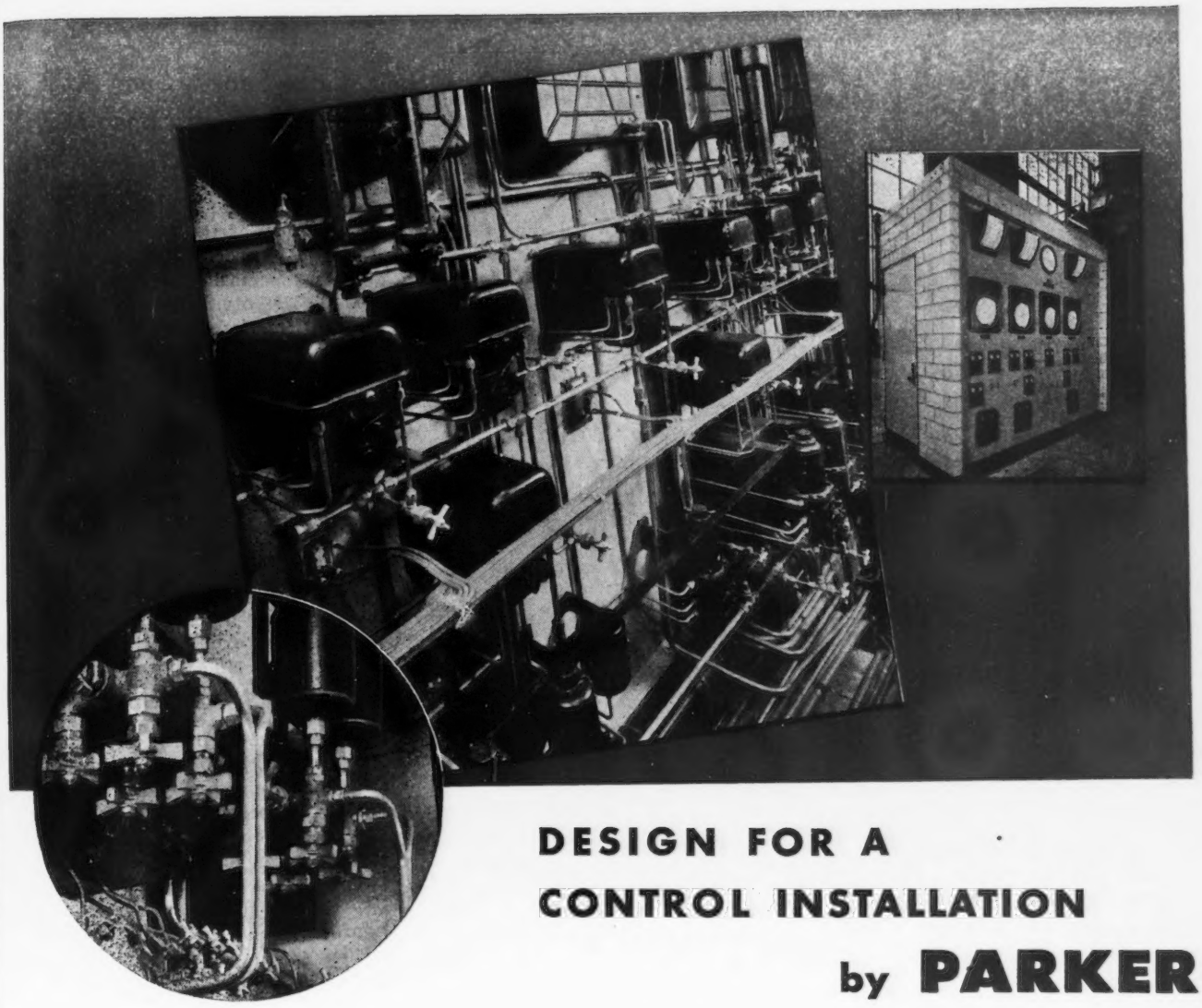
Some idea of the vast increase in the use of construction machinery by the Armed Forces may be gathered from a review of the industry and estimates by WPB which show that at the end of 1944, shipments by this industry from factories were approximately 400 per cent above those of 1939. In 1940, for instance, shipments amounted to $260,000,000 which had grown by 1944 to $810,000,000. The total crawler tractor shipments in 1940 amounted to $90,000,000 and in 1944 they reached a total of $300,000,000.

Some of the other units which showed an astounding increase in shipments were crawler cranes and shovels, 3216 in 1940 and 6950 in 1944; truck cranes and shovels, 378 in 1940 and 2550 in 1944; cranes and shovels, 3594 in 1940 and 9500 in 1944; bituminous distributors, 218 in 1940 and 450 in 1944; crushing plants, 65 in 1940 and 850 in 1944; road rollers (three-wheel), 1317 in 1940 and 3000 in 1944; ditching machines, 232 in 1940 and 630 in 1944; contractor's self-priming, centrifugal pumps, 14,194 in 1940 and 40,000 in 1944; tractor mounted cranes and shovels, 800 in 1940 and 8600 in 1944; tractor mounted winches, 1411 in 1940 and 21,000 in 1944.

The great increase in demand for these types of machinery is due, in part, to the expansion of battlefronts in all theaters of war, and in part to the fact that this machinery takes a terrible beating.

Many of the machines, too, are battle casualties. Shipping losses, careless handling and other causes also take a high toll adding to a demand for machinery that seems almost limitless.

The Corps of Engineers buys all tractors sold in the United States at the present time, and they are distributed, through a committee, to the Army, Navy, Marines and to the United Nations, according to needs. To this flow of new machinery is added vast quantities of rehabilitated equipment under a program setup by the Redistribution and Salvage Division of the Office of the Chief of Engineers at Washington under the direction of Col. E. R. Needles. Approximately 15,000 pieces of machinery ranging from five-yard shovels down to two-inch pumps were rebuilt during 1944, representing, with spare parts included, an expenditure of about $30,000,000.



# DESIGN FOR A CONTROL INSTALLATION by PARKER

This boiler control installation is an example of Parker Fluid Power Engineering.

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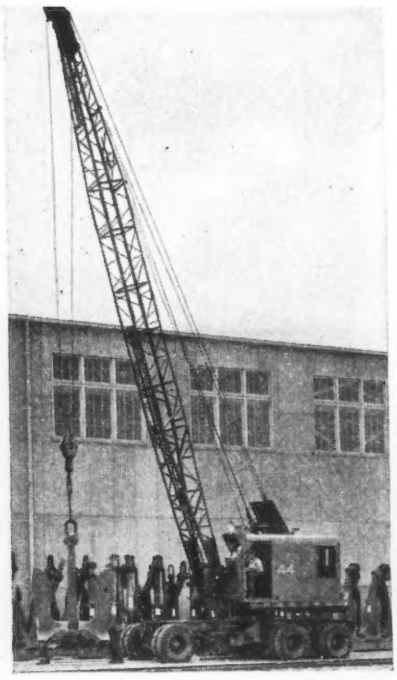
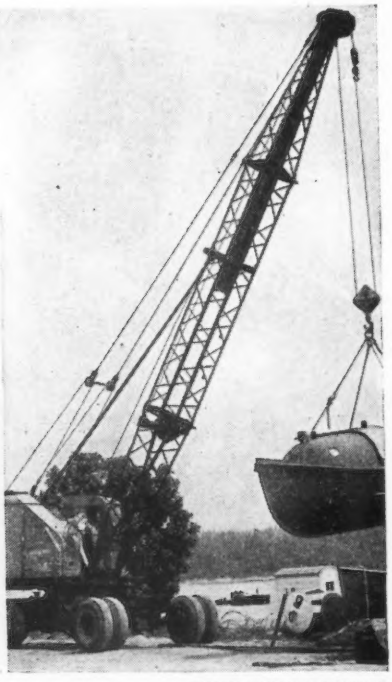
# These Naval Pachyderms





OFFICIAL NAVY PHOTOGRAPHS

# move the burdens of Victory

*Osgood Mobilcrane (lifting battleship anchor) and General Supercrane (with service boat) on the job at Bremerton Navy Yard and Keyport Torpedo Station.*

Navy building of ships and ordnance to go with them is vital to Victory. And at the great Navy Yard at Bremerton, and its affiliated Torpedo Station at Keyport, vast tonnages of heavy, cumbersome materials must be constantly on the move to provide the weapons of war—on time.

Contributing to the speedy efficiency of these and many other shipyard operation bases are Osgood Mobilcranes and General Supercranes. These powerful, versatile, "mechanical beasts" are forever on the job—lifting, hauling, positioning—everything from steel hull plates to prefabricated deck sections.

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★ **One engine does the work; moves the outfit, operates the crane, saves fuel.**

★ **Mobilcranes and Supercranes are world-famous for ruggedness, power, ease of control and maneuverability.**

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## Coke Supply Seen As Key to Expansion In Sweden's Steel Output

***New York***

• • • **One of the effects** of the stoppage of Sweden's trade with Germany is an increasing strain on the iron and steel situation. According to the trade treaty for 1944 the German deliveries of iron and steel goods were to total 280,000 tons, representing about one-fourth of Sweden's consumption. When the Swedish-German trade was practically halted last fall the bulk of this quantity had been received, but at present Sweden is entirely cut off from such imports.

This development was foreseen, however, and when it happened much had already been done to increase Sweden's own iron and steel production. Many expansions had been made at the steel mills, and much of the existing equipment had been modernized. It had also become necessary to divert high-grade steel facilities to the production of commercial grades. Commercial steel now constitutes about 60 per cent of the total output, while in pre-war years production of high-grade steel exceeded that of commercial grades.

Present plans aim at increasing the production of rolled iron, which in 1943 amounted to 885,000 tons, to at least 1,000,000 tons. Such an increase is considered quite possible, but the goal might not be reached until 1946. The whole problem will be further complicated if the import of coal and coke cannot be resumed during the next "fuel year," that is the period July 1, 1945-July 1, 1946.

Since Sweden's supply of scrap iron is limited, the expansion of the steel production must be based exclusively on pig iron. As fuel, domestic charcoal will be used as much as possible. The stocks of coke will be reserved primarily for Domnarvet, Sweden's largest iron works. At present this plant accounts for about one-fourth of Sweden's whole iron production and about one-third of the output of commercial steel.

The Swedish output of pig iron, which in 1938 amounted to about 670,000 tons, had been stepped up to 780,000 tons in 1943. In 1944 it probably was well over 800,000 tons, having reached 440,000 tons during the first half of the year.

**The new pig iron plant** near Lulea, in the far north, which is financed by the government, began operations during 1944. It has a capacity of

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Kelite Service Engineers use pH constantly to control their cleaning and processing operations . . . to keep them steadily "on the beam" where they'll perform their functions with minimum time and trouble.

Kelite Chemists, building on the knowledge gained from thousands of pH tests in the field, have been able to develop materials precisely fitted to the needs of metal finishers.

***Aluminum Cleaning***—Kelite KDL No. 1 cleans aluminum thoroughly without endangering the surface of the metal in any way. It has a perfect balance of the characteristics which rigid pH Control makes possible . . . quick and thorough soil removal . . . complete safety for the surface being cleaned . . . free rinseability. The preparation of aluminum for anodizing, chromodizing or spot welding is most efficient and reliable when KDL No. 1 is used in the cleaning bath. Time charts and inspection records prove this.

***De-greasing, De-carbonizing***—Kelite Ketrex removes oils, grease, residual gums and light carbon by simple cold immersion. It is safe on all metals. Kelite Super Ketrex loosens sludge and carbon so they can be removed by a forced rinse.

***Pre-cleaning***—When metal is being prepared for painting, anodizing, plating or spot welding, the efficiency of the hot tank processing and the subsequent finishing or joining is greatly improved by a pre-soak in Kelite Ketrex. This penetrates into the recesses of the metal, forcing out particles of soil as well as oil and grease, and puts the surface in a condition which enables the rinse that follows to remove all excess contamination.

***De-scaling***—Kelite Scale-Off simplifies control of the pickling bath . . . thoroughly removes rust and water scale without endangering the healthy metal.

Kelite Process K removes scale and corrosion, creates the proper tooth for reliable plating or paint adhesion and inhibits the action of rust—in one soak.

***Spray Booth Control***—Kelite Spray Booth Coating stops accumulation of paint on booth surfaces.

Kelite No. 118-C-4 controls paint in the water curtain.

***Spot Welding***—Process K-1 (Kelite material for preparing aluminum for spot welding) has recently been improved by the addition of a "B" factor which greatly increases the number of welds possible between tip cleanings.

Kelite Process K-1-B renders an aluminum surface extremely low in micro-ohms resistance. No heating is required for its use and no critical time element is involved. Complete assemblies may be processed in K-1-B.

Wherever there's dirt, grease, grime, scale, corrosion or any undesirable deposit or contamination, Kelite materials with pH Control can solve the cleaning problem. Ask your local Kelite Service Engineer how pH Control can help to put your cleaning and processing operations "on the beam."

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**Rivets**

Sizes up to 1¾ in. diameter, all commercial heads and lengths. Materials include low-carbon steel, boiler steel, structural steel, copper-bearing steel, wrought iron. Annealed, high strength, close tolerance and other special properties where desirable.

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All regular types of nuts including square, hexagon, castellated, slotted, cold punched, hot pressed, double chamfered, semi-finished. Carbon steels, alloys, non-ferrous. Sizes up to 2 inches bolt diameter.

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60,000 tons per year, using two ele tric furnaces, with coke as the redu ing agent. A third furnace, whic would raise the capacity to 90,00 tons, is being planned. It will be com pleted at the earliest in the beginnin of 1946.

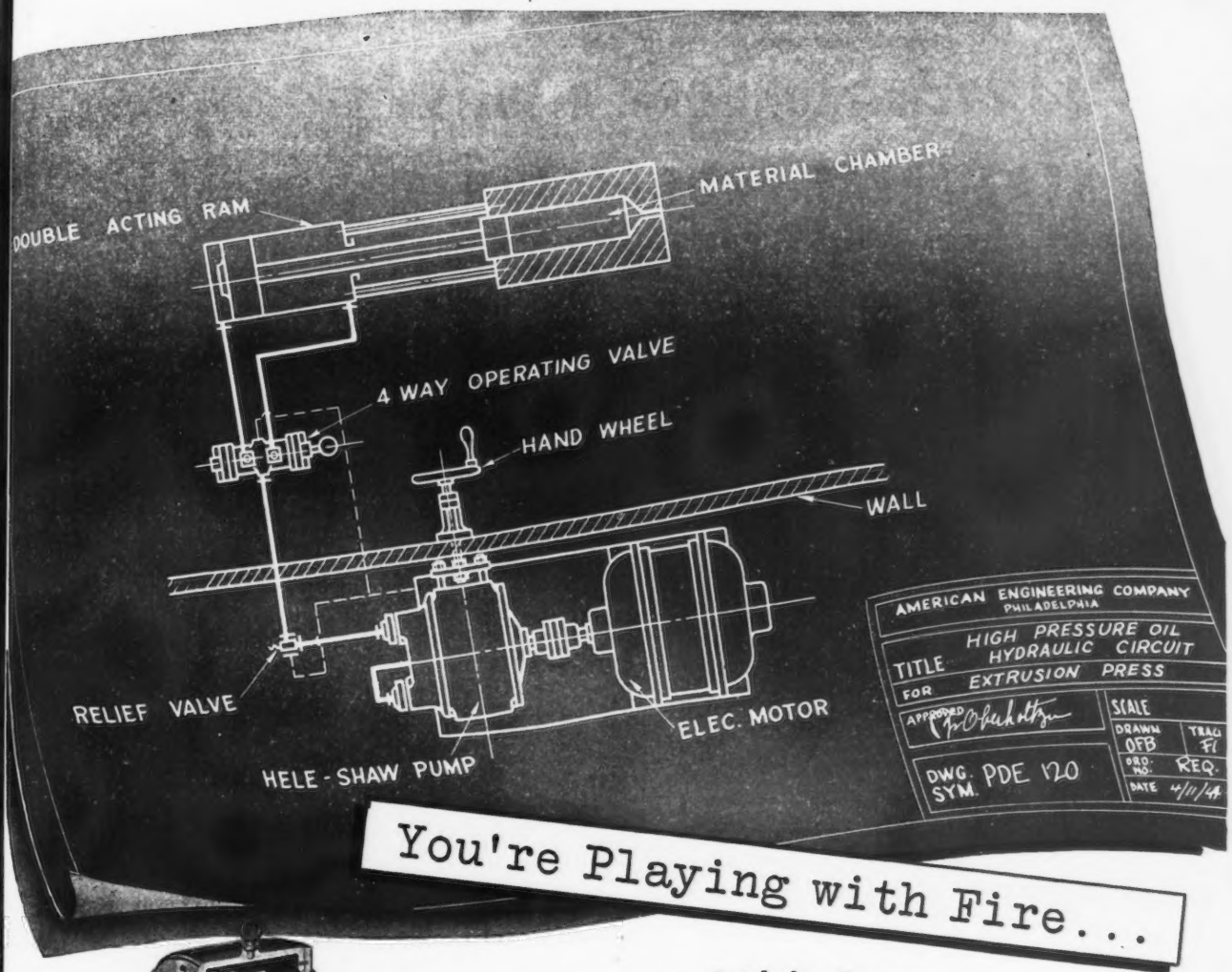
In one respect recent trade develop ments have meant an improvement t the Swedish iron and steel industry Exports of iron ore to Germany hav ing been completely halted, there wil no longer be any difficulties in gettin enough labor in the mines owned b the iron and steel producers them selves.

Most Swedish iron and steel pro ducers have acquired entire or partia ownership in iron mines in centra Sweden, though some still purchas their ore. Normal production for th central region is considered to b about 4,000,000 metric tons. Manga nese and other metals, particularly those required in alloy steel, are con tained in considerable amounts i these ores.

Current estimates of probable iron ore reserves vary widely. The depos its are by no means inexhaustible. As suming that all probable reserves are retained for the use of domestic in dustry and that steel production aver ages slightly above the 1933-1942 fig ures, the low-phosphorus ores would last about 75-80 years and the manga niferous ores about 110 years, ac cording to recent estimates by the Swedish Geological Survey and the Board of Trade. However, should ex ports continue at the rate prevailing in the 1933-1942 period, the ores would probably be exhausted in 45 years. Few new mines have been found in the central region, but known mines have revealed unsus pected dimensions.

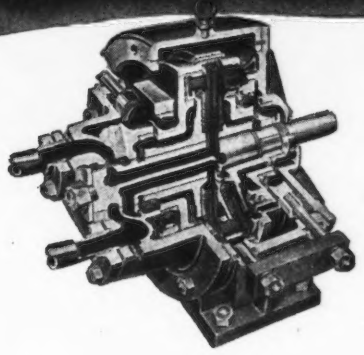
The iron and steel producers have lately shown renewed interest in prospecting work and Sweden has long been prominent in the develop ment and use of magnetic, electric, seismic and gravimetric methods of ore detection and in ore location by diamond drilling.

**Ore reserves contained** in the known deposits of Swedish Lapland are much more important. A con servative estimate places the total quantity of ore at the Kiruna deposit at 750,000,000 metric tons. Later es timates consider twice that quantity possible, and even 2,000,000,000 tons is sometimes mentioned. Iron content runs from 56 per cent to an occa sional 70 per cent, the bulk of the ore containing about 61 per cent. Other Lapland iron-ore deposits include the




# You're Playing with Fire...

## —*Said the Censors*



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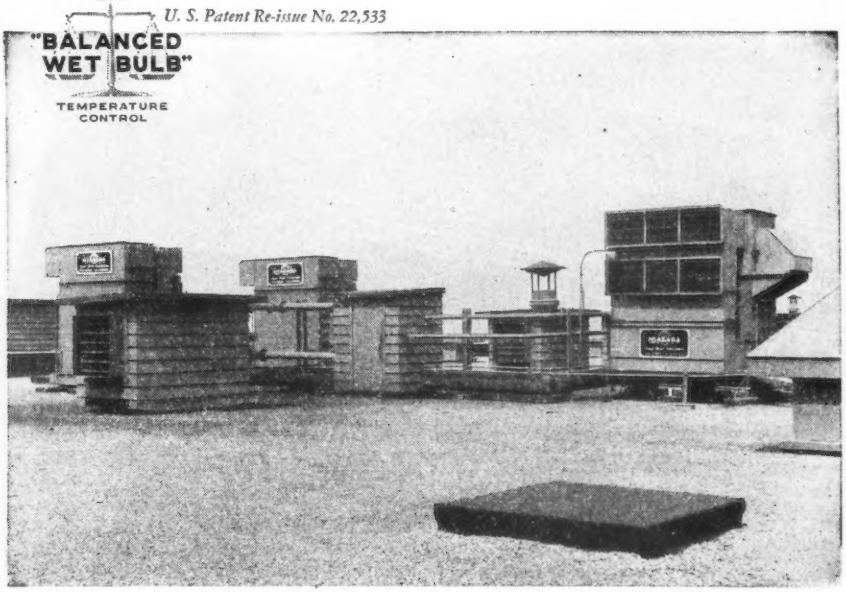


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near-by Luossavaara and Malmberget. The phosphorus content of the Kiruna ores runs from 0.017 to 1.86 per cent.

In Swedish iron ore mining the Grängesberg Co. is of outstanding prominence, both in regard to the magnitude of its operations and its relationship with the Swedish Government. As joint owner with the government a Grängesberg subsidiary, the Luossavaara-Kiirunavaara Co., operates all the most important ore fields in Lapland.

The present Swedish mining law became effective on Jan. 1, 1940. It does not permit prospecting by foreigners. A law of May 30, 1916, amended June 7, 1934, prohibits the alien ownership of mines or mining shares in Sweden, except under specified conditions. Foreign ownership of one field in Lapland and of some nine iron-mining companies in central Sweden, which hold about 9 per cent of the ore reserves in that region, antedated the 1916 law and were therefore excepted from its provisions and the subsequent amendment.

In a recent article in *Svenska Dagbladet*, Magnus Tigerschiöld of the Swedish Ironmasters Association reviews a recently published work, "Geology of the Central-Swedish Iron Ores," by Per Geijer, head of the Swedish Geological Survey, and Professor Nils H. Magnusson. According to these two experts the deposits in central Sweden contain about 220,000,000 tons of rich iron ore or schlich obtained by concentration. This estimate, it is added, should be regarded as a minimum.

No less than 53 per cent of the resources consist of high-phosphorus ores; while ores from which Swedish high-quality steel can be made constitute only about 30-35 per cent of the total. These reserves would secure the manufacture of high-grade steels in Sweden for about 100 years, assuming that no such ores were exported. Geijer and Magnusson call attention, however, to the fact that part of the Lapland ores can be used for the same purpose.

It has proved possible for instance to separate the phosphorus in the Gällivare ores and thus obtain an exceedingly pure and rich concentrate, which will probably be used more and more by the Swedish producers of high-quality steels. It is estimated that the total iron ore deposits in Lapland will last over 200 years, even at a rate of extraction as high as in the late 1930's.

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## U. S. Coke Production Reaches Record Levels As Capacity Increase

***Washington***

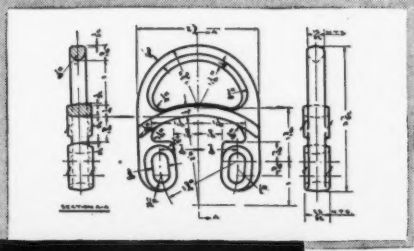
• • • **Production of byproduct and beehive coke in the United States in 1944 advanced to a new record of 73,618,000 net tons, according to preliminary figures compiled by the Bureau of Mines. This was an increase of 3 per cent over the previous record output of 1943 and 29 per cent higher than 1940, the last full year of peacetime production. The gain over 1943 is attributable to the increased output from byproduct ovens, as production from beehive ovens decreased 12 per cent. When compared with 1940, byproduct coke output increased 23 per cent and beehive 129 per cent. Although output from beehive ovens amounted to only 10 per cent of the total coke output each year since 1940, production from this source has been extremely important in helping to meet the demand for coke by the iron and steel industry.**

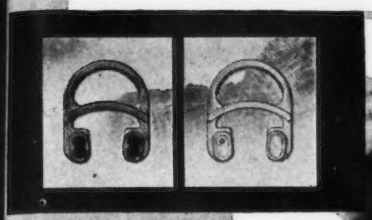
**The remarkable production record made by the coke industry has been due to the large expansion program undertaken since 1940. In the byproduct industry many old ovens were completely rebuilt and new ovens added at plants where more furnace coke was urgently needed. In addition, eight new plants have been completed, two of which are located in Texas and one in California, which raised to 22 the number of states producing byproduct coke.**

**A total of 528 new ovens (not including old ovens completely rebuilt) with an annual coke capacity of 2,595,000 net tons were built in 1944 raising the number of new ovens constructed since 1940 to 1988 with a yearly coke capacity of 10,844,000 tons; at the close of 1944, the estimated maximum annual coke capacity of the byproduct industry was 24 per cent higher than in 1940. In the beehive industry many old ovens that had been abandoned for over a decade were repaired or entirely rebuilt and placed in operation. The estimated annual beehive coke capacity in 1944 was 22 per cent higher than 1940. The expansion of byproduct and beehive coking capacities and the increased production from these sources enabled the industry to meet essential wartime requirements of metallurgical fuel.**

**The tremendous wartime expansion of the iron and steel industry increased the requirements for metal-**

# *Can you Complete this Brass Die - Casting Die in 22 hours?*





Photos Courtesy
McGill Mfg. Co.
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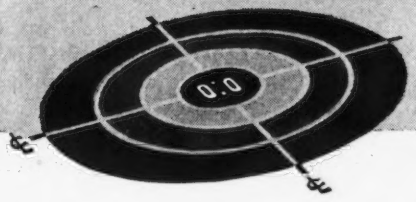

Both halves of this high chrome steel die were worked together with all layout, milling and drilling operations being completed in one set-up. The Milwaukee Rotary Head Milling Machine completed the job in 22 hours.

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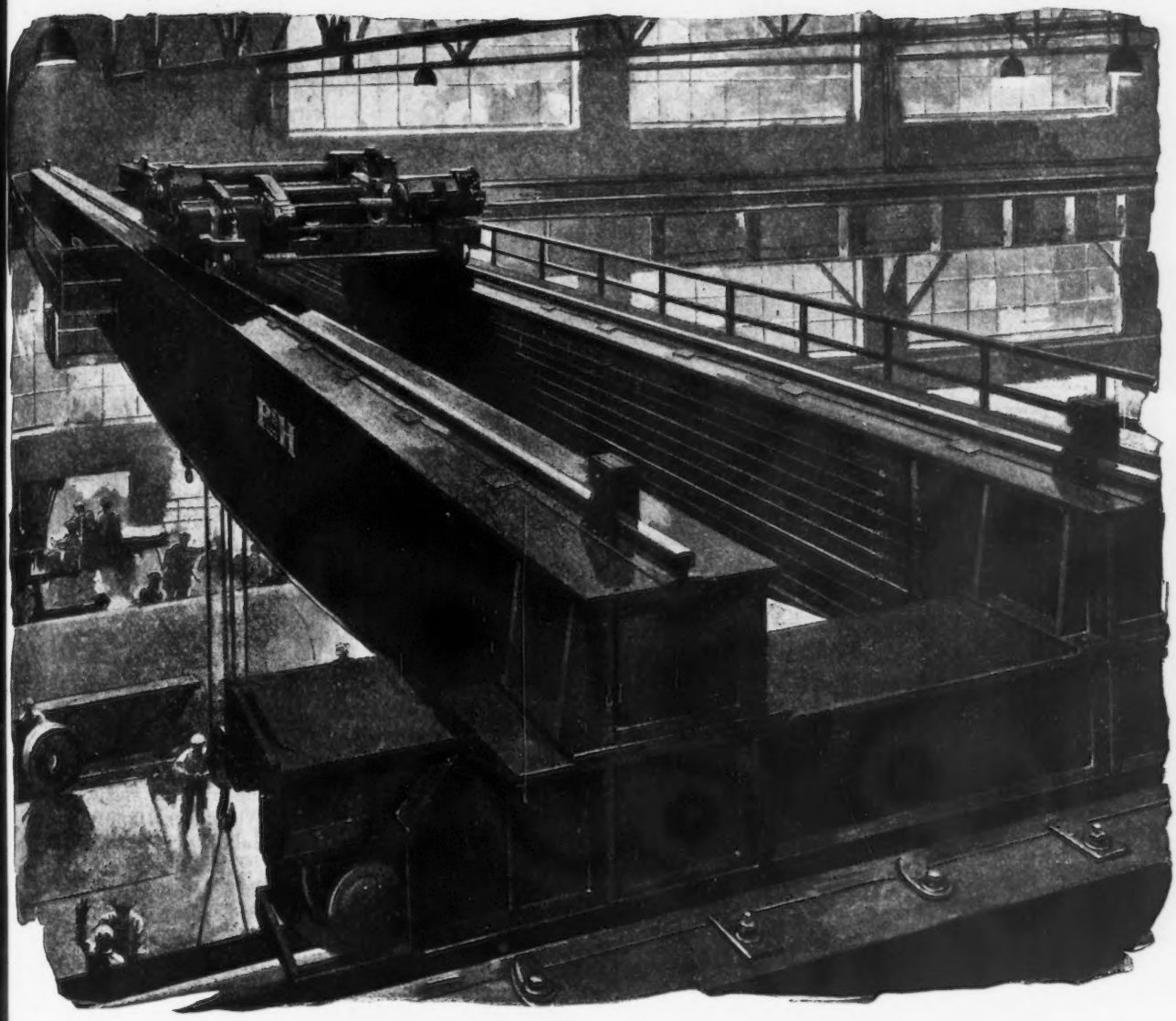
lurgical coke. In 1940, blast furnace used 74 per cent of the combined output of byproduct and beehive coke and requirements steadily increased until a peak was reached in 1943 when more than 80 per cent moved to iron blast furnaces. This ratio decreased slightly in 1944 and preliminary statistics indicate that furnace requirements amounted to approximately 7[illegible] per cent of the total output. The increased shipments to blast furnaces were made at the expense of the domestic coke trade, and the ratio of domestic coke sales dropped from 1[illegible] per cent of the total coke output in 1940 to less than 7 per cent in 1943.

The increased output of byproduct coke in 1944 made it possible to move some coke which had been diverted to the metallurgical industries in 1941-43 back into the domestic coke markets, and domestic coke sales increased 30 per cent over 1943. A substantial gain has been made in the quantity of coke used in the manufacture of water gas, a gaseous material used both as a fuel and as a starting point for making important chemical syntheses. The quantity of coke used in the manufacture of water gas in 1944 was 48 per cent higher than in 1940. Disposal of coke for other industrial purposes which includes coke used for nonferrous smelting, lime burning, the manufacture of mineral wool, and miscellaneous industrial uses did not vary greatly.

Production of crude coal tar, ammonia, and coke-oven gas in 1944 followed the pattern of coke production and reached levels never attained before and gains of 4, 5 and 6 per cent, respectively, over 1943 were recorded. Although production of the primary byproducts has substantially increased since 1940, the average yield of some byproducts per ton of coal carbonized has declined because of increased oven temperatures and shorter coking periods. For example, crude tar and ammonia production in 1943 fell short of the 1942 figures although more coal was carbonized in that year. Although publication of data on crude light oil for 1944 is withheld in accordance with government wartime censorship regulations, the output of crude light oil in 1943 was 16 per cent higher than in 1940.

Byproduct and beehive ovens require certain high quality coals for the manufacture of coke suitable for metallurgical purposes, and several governmental control measures relating to supplies and distribution of such coals were established in 1944. Under these regulations coke plants

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| Containers, Heat Treating | ☐ | Shafts | ☐ |
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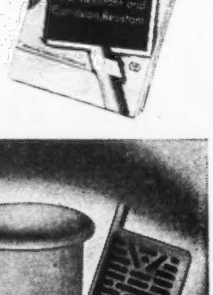

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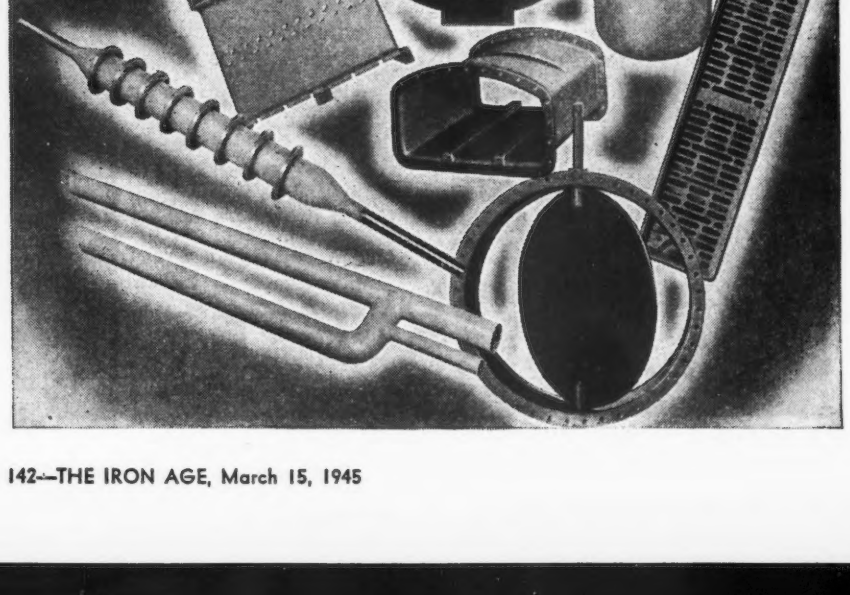




that used byproduct coals mined in the East or Middle West were given priority on the available supply of such coal, and the Solid Fuels Administration for War diverted thousands of tons of byproduct coal from industrial plants which had been using it for ordinary steam generators to the coke industry. The byproduct diversion program was undertaken by the Solid Fuels Administration for War in order to build stock piles to at least 30 days' supply which it considered the minimum required in wartime. Stocks at byproduct coke plants varied only slightly during 1944 and at the end of the year were sufficient for 23.7 days' requirements compared with an all-time high of 45.6 days' on Nov. 30, 1942.

## National Debt Hits New High in January

***New York***

• • • **Although the federal government's receipts in January were larger than in any previous January in history, they were equal to less than half the amount spent, according to the Alexander Hamilton Institute. After allowing for net trust account receipts, there was a deficit of $4,408,000,000. Part of this deficit was met by borrowing $1,778,000,000 which lifted the total direct debt to a new high record of $232,408,000,000.**

**The remainder of the deficit was met by withdrawing $2,630,000,000 from the treasury. The treasury balance, which reached the record high figure of $22,236,000,000 at the end of December as the result of the Sixth War Loan, was thus reduced by a substantial amount. Although the balance at the end of January was still relatively large, amounting to $19,606,000,000, the prospect is that this will not be sufficient to meet the deficits during the remainder of the present fiscal year. Consequently, another war loan drive will be necessary before the end of June, says the institute.**

**The budget for the current fiscal year calls for total expenditures of $98,912,000,000. This means that $42,284,000,000 will be spent during the last five months since $56,628,000,000 were spent in the first seven months. Receipts during the last five months are estimated at only $21,860,000,000. Consequently, there will be a total deficit of $20,424,000,000 during this period, or an amount in excess of the Treasury balance at the end of January.**

## Enemy Materiel Under Constant Inspection By Army Ordnance Men

By DONALD BROWNE

*Washington*

•• Realizing that in the final analysis competition between the technical men in American and enemy laboratories will decide the present war as much as the numbers of well directed and trained fighting men the Research and Development Service of the Ordnance Department has organized to win the desperate competition for superiority in new weapons and in the design of existing ones.

This effort is extended from the office of the Chief of Ordnance to every theater of war to secure every bit of detailed engineering information on enemy ordnance available.

The necessity for systematic organization to accomplish these purposes was recognized early in the war. The framework for this consists of: (1) the Technical Intelligence Branch, Research and Development Service, Office of Chief of Ordnance, to supervise and coordinate the project as a whole; (2) an organization at Aberdeen Proving Ground to receive, catalog and examine enemy materiel returned for that purpose; (3) field agencies to collect and ship the material from the battle front to Aberdeen, Md., and (4) various governmental, commercial and private research organizations to make engineering tests and analyses.

The Technical Intelligence Branch, Research and Materials Division, Research, and Development Service performs the following functions:

1. Maintains liaison with other branches of the Army, Navy and Marine Corps. to facilitate the gathering, dissemination and exchange of foreign ordnance information.

2. Maintain liaison with Research and Development Center of Aberdeen Proving Ground, Arsenals, Office, Chief of Ordnance, Detroit, United States ports of entry for foreign ordnance materiel, service, schools, and other outside accredited agencies cooperating on the examinations of foreign ordnance.

3. Coordinates efforts between the interested agencies.

4. Analyzes military and naval attache reports and cables of interest to the Ordnance Department and directs information secured from


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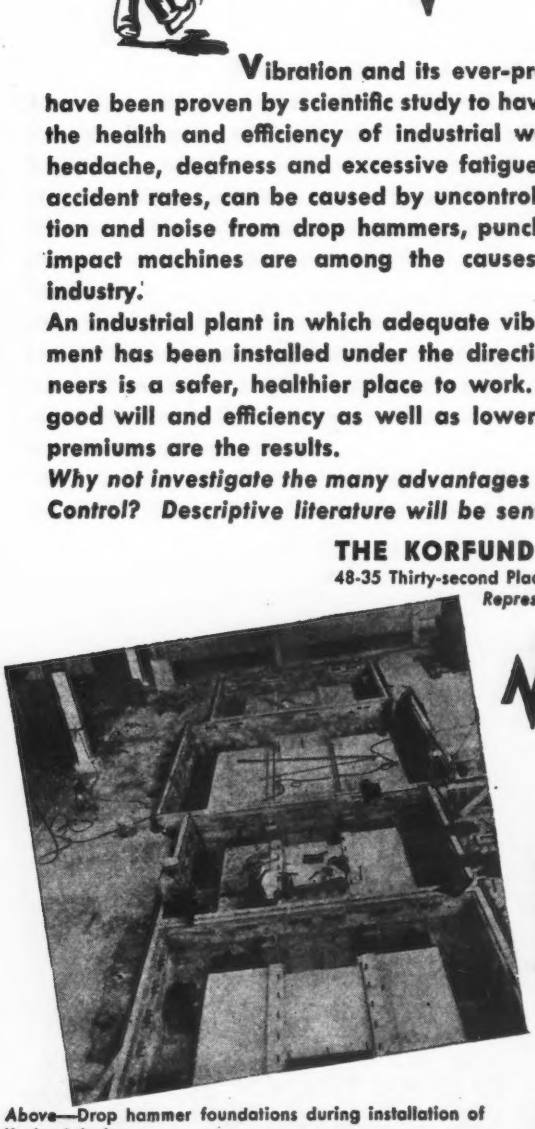
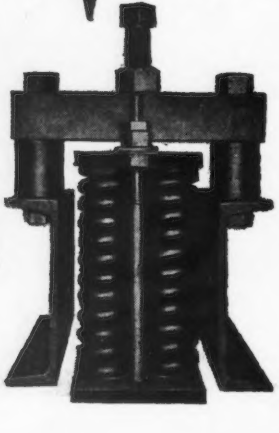


KORFUND VIBRATION CONTROL



*Above*—Drop hammer foundations during installation of Korfund Isolators.
*Right*—Typical Korfund Steel Spring Isolator.




these sources to the proper Ordnance office.

5. Collects all available data on foreign ordnance.

6. Prepares and distributes thrice-weekly intelligence summaries.

7. Provides technical data to various War Department offices for preparation of manuals.

8. Prepares technical articles on foreign ordnance for War Department publications.

The Technical Intelligence Branch also maintains a record of all items received from abroad, coordinates the test program for examination and analysis of each item to be processed and disseminates reports and other information to those who should receive this material. It maintains close liaison with such agencies as the Office of Strategic Services and the Foreign Economic Administration.

Frequent regular reports are received as well as special cables where occasion dictates so that full advantage is taken of any new developments on the enemy front. As Maj. Gen. G. M. Barnes, Chief of the Research and Development Service has stated, the objective is to know everything and why about enemy ordnance equipment. For example, if the enemy changes the design of a firing pin in a fuze, we not only want to know what change has been made but also when and why.

The material that is received at Aberdeen serves among others the following purposes:

a. Analysis of enemy designs for ideas with which to improve American Ordnance.

b. Determination of the basic trends of enemy ordnance design as a guide for American design policies.

c. To uncover weakness in enemy equipment upon which the Army may capitalize both in design of material and in combat.

d. To check for substitute materials as an indication of shortages in enemy raw materials, improvements in manufacture and possible use in American equipment.

e. For use in preparation of operation and maintenance manuals for issue and training of American troops so that they may know enemy equipment and how to use it upon the enemy when the equipment is captured, if the occasion is right, or how to destroy it.

f. For strategic analysis.

Realizing the magnitude of the problem, the Ordnance Department very early began to catalog, and

photograph to make available for exhaustive examination the material obtained.

Promptly upon receipt of any item it is reported to the Technical Intelligence Branch with recommendations for further test or study. This program is coordinated with the Development Divisions of the Research and Development Service and others in the Office of the Chief of Ordnance, to insure that all essential data on the item are obtained in a systematic manner, that there is no undue duplication of effort, and that all desirable examinations are carried out. After coordination the programs are released and directives issued for tests.

These cover among other things road tests for automotive equipment; firing tests for guns and ammunition to determine ranges, muzzle velocities, penetration of armor and similar data; detailed analyses and tests of fuels and lubricants, propellants and high explosives and searching examinations of metal components to determine strength, composition and processes of manufacture. Design studies enter all phases of these investigations.

Some of this work may involve only such examinations as can be carried out completely at Aberdeen. However, this is seldom the case. Agencies outside the Proving Center are enlisted to perform appropriate parts of the investigations.

For example, the arsenal laboratories are tapped for their share of the work; notably, Watertown for ferrous metallurgy; Frankford for non-ferrous metallurgy and fire controlled instruments; Picatinny for propellants and explosives; and Rock Island for gun carriages, record mechanisms, etc.

## *Civilian Steel Pared For Second Quarter*

***Washington***

• • • **Second quarter steel allocations** for the production of domestic, non-electric cooking and heating stoves were cut to 36,500 tons, a reduction of 11,500 tons under the 48,000 tons allocated for the first quarter.

WPB officials announced the slash at a recent meeting of the Appliance and Heating Stove Industry Advisory Committee. Of the total allocation 27,000 tons will be allotted for cooking stoves and 9500 tons for heating stoves. First quarter allocations totaled 37,000 tons for cooking stoves and 11,000 tons for heating stoves.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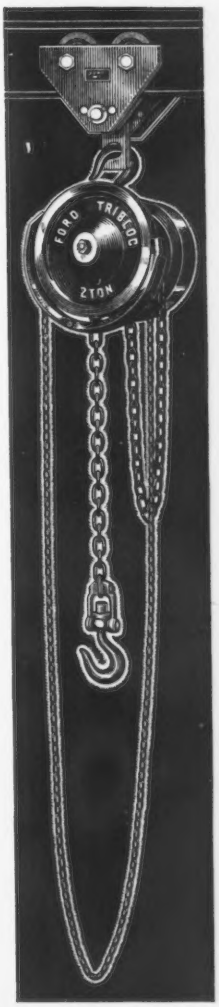


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## Harvester's Net Income Drops As Sales Rise

***Chicago***

• • • **Highest net sales in the history** of International Harvester Co. were recorded in 1944, but net income dropped to $25,296,709 from $25,692,944 in 1943.

Sales in 1944 were $640,468,169 compared to $459,579,726 in 1943. War products accounted for 52.5 per cent on the farm equipment and truck manufacturers' sales, although, according to Fowler McCormick, president, an increase in sales to regular customers of approximately $100,000,000 was the largest single factor in the sales gain. Volume of war products, including settlements on terminated war contracts, increased approximately $73,000,000 from 1943 levels, and sales of service parts of $129,530,000 were said to represent an all-time high. Transfer of $84,551,203 from the company's surplus account to the no par common stock capital account was made in order to provide funds for new postwar plants, facilities and working capital, according to McCormick.

Physical damage to the company's French subsidiary was reported to be small, but it was indicated that inventories were depleted and operations at a stand-still.

## Propose Merging Of Two Coal Companies

***Pittsburgh***

• • • **Officers of the Pittsburgh Coal** Co. and the Consolidation Coal Co. have reached a tentative agreement on a basis for eventual merger of the two bituminous coal concerns, according to the companies.

The proposed merger is being submitted for clearance to certain interested government departments; the submission of formal agreements to the boards of directors and subsequently to the stockholders of the two companies is subject to satisfactory clearance by these departments.

In a statement, A. K. Oliver, chairman of Pittsburgh Coal, and George H. Love, president of Consolidation, said: "A merger of the two companies is desirable for a number of reasons. In addition to the obvious economies that could be effected, the combined facilities would considerably improve the position of the new company in its effort to meet the serious postwar problems of the industry.

The greater diversification of commercial grades of coal would offer the consumer a wider range of coals, and for the company would result in an enlargement of market opportunities, while at the same time affording protection from further inroads into coal markets by competing sources of fuel and power.

"Due to the necessity of obtaining clearance from various government departments, legal requirements of notice for meetings, etc., stockholders' meetings of the companies to consider the merger probably cannot be held before June 1, 1945."

## Drum Industry Pleads For Price Increases

*Washington*

• • • **The new Steel Drum Industry** Advisory Committee at a recent meeting expressed a need for price increases because of the price increase of 10c. per 100 lb. for hot rolled carbon steel sheets.

Immediate increases were asked for open-head drums, production of which was resumed in July 1944. Prices of open-head drums were abnormally low during the "freeze" period of 1942, the Committee said, and as a result open-head drums are being produced at a loss.

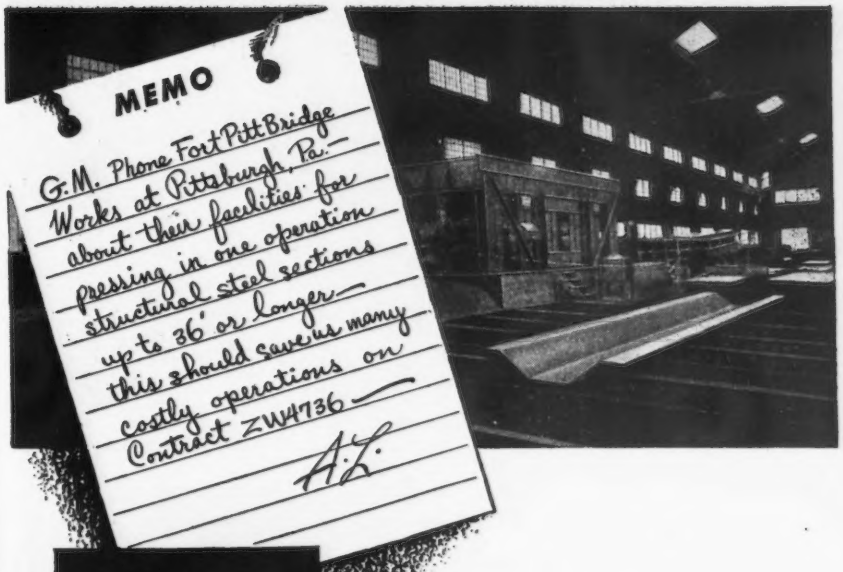
OPA indicated its willingness to give full consideration to these recommendations in the light of more nearly complete data to be secured from the industry.

OPA presented general outlines of a proposed new regulation covering new steel drums, pails and containers that will replace individual "freeze" ceilings with uniform dollar-and-cent maximum prices for some items. The Committee agreed to assist OPA in obtaining data needed to complete a study of the industry.

Results of the study will form a basis for the dollar-and-cent-ceilings to be included in the new regulation. The Committee named two temporary subcommittees to make studies of the new measure when it is drafted.

Officers elected at the committee meeting are:

Chairman, Harry W. Lees, vice-president in charge of sales, J & L Steel Barrel Co., Cleveland; vice-chairman, R. L. Brammer, manager of sales, Wheeling Corrugating Co., Wheeling, W. Va.; treasurer, J. A. Connelly, vice-president, United States Steel Products Co., Sharon, Pa.; secretary, Mrs. Charlotte M. Angrada, Steel Shipping Container Institute, Inc., New York.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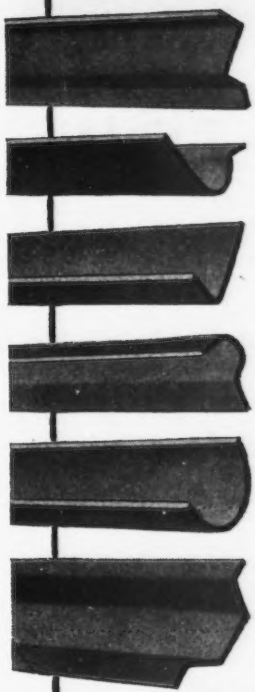

*Descriptive Bulletin sent on request.*

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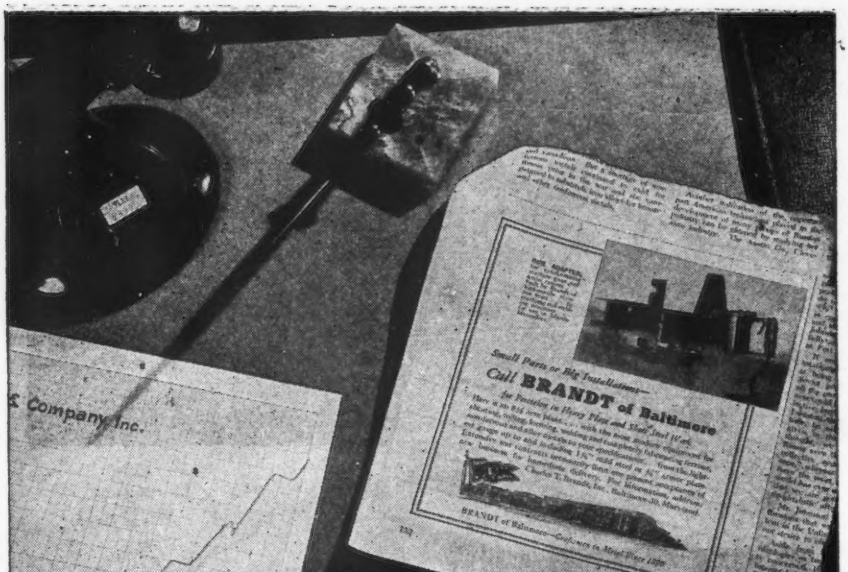
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## Termination Cost Memorandum Issued

***Washington***

• • • **Regulation No. 14, dealing with termination cost memorandums, was issued last week by Robert H. Hinckley, director of Contract Settlement, who said that the purpose of the regulation is to clarify accounting practices connected with contract settlements and assure greater uniformity in their application.**

**The first eight Termination Cost Memorandums accompanied the issuance of Regulation 14. They deal with the following subjects: Recognized commercial accounting practices; general, administrative and distribution expenses; common items; partners' and sole proprietors' salaries; application of the limitation of subparagraph 1 (i) of the statement of cost principles; materials acquired prior to date of contract; initial costs; and rejects.**

**Pointing out that these memorandums are intended as guides to the personnel of contractors and contracting agencies in negotiating settlements, Mr. Hinckley said:**

**"In general these memorandums reflect the cost philosophy embodied in the Contract Settlement Act of 1944, which recognizes the accounting practices of the contractor wherever they are reasonable and appropriate. They are intended to answer certain questions that have been raised as to the accounting principles to be followed in settling terminated contracts and should promote greater uniformity in the termination accounting practices now in use."**

## Canadians Building Ships to Fight Japs

***Toronto***

• • • **Increased activity in Canada's shipbuilding industry is indicated in the announcement by C. D. Howe, minister of munitions and supply, that orders have just been placed for 17 transport ferries, representing a total cost of $25,500,000. This new order brings the total for Canadian shipbuilders to 71, and boosts shipbuilding contracts to approximately $155,000,000. Of the 54 transport ferries previously ordered, 15 have been launched and one delivered, Mr. Howe stated. In addition to the transport ferries, the Minister stated that orders for two more China coasters of 1350 tons, have been**

placed with Prince Rupert Drydock and Shipyards, Prince Rupert, B. C.

Canada now is building 160 vessels of various types to be used in the war against Japan. The China coasters are cargo vessels and are being built in Pacific Coast yards, and there are now 15 on order. The transport ferries are huge landing barges and it is understood they will be used in the actual invasion of Japan. These are being built in shipyards on the St. Lawrence and on the West Coast. They are designed for large scale amphibious operations and are being built for Great Britain.

Also being built in Canada are 21 maintenance vessels of 10,000 tons at a cost of about $2,000,000 each. These are completely equipped floating workshops, able to remain at sea indefinitely. These also will be used in the Pacific warfare. Canadian shipbuilders also have orders for 20 coastal cargo boats of 350 tons and costing $450,000 each. They are being built for Great Britain for use in the Pacific.

## *Combat Jet Plane Revealed by Arnold As Lockheed Design*

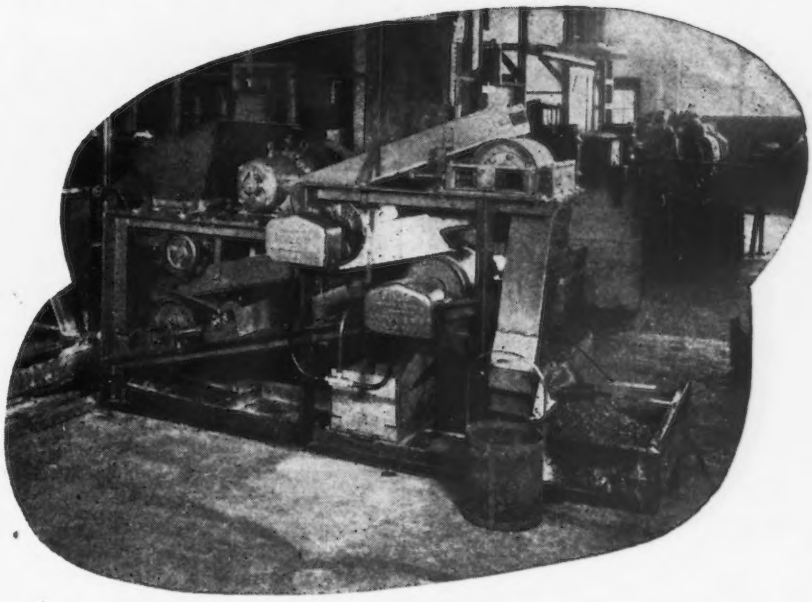
***Washington***

• • • **Existence of the P-80 Shooting Star, single engine jet plane designed by Lockheed and in production at three of their plants on the West Coast was officialy acknowledged by General of the Army H. H. Arnold recently.**

**First actual American combat plane powered by the gas turbine engine, it is presumed from the announcement that the new craft has been introduced into combat, or is about to be. The commanding general of the Air Forces cautiously asserted that it is believed to be the fastest fighter in existence.**

**The new plane is in production in four Lockheed plants, all in California, and in the North American plant at Kansas City. It was also recently disclosed that General Electric's Syracuse plant has been converted to gas turbine engine production, probably for the P-80, since this is the only craft of its type in production for the A.A.F. Allison's Indianapolis engine plant, at one time geared for the production of over 1000 in-line reciprocating engines per month has also been partly taken over for this project. The Chevrolet Tonawanda, N. Y., plant is also retooling for the production of a new aircraft**


# This Dings DA Separator



The Zenith Radio Corporation deburrs steel radar and radio parts in tumbling mills with a mixture of granite stones, steel balls, limestone, compound and water. After the steel balls are screened out, this Dings DA Magnetic Separator is used to automatically separate the remaining ferrous and non-ferrous materials.

*paid for itself in 90 days!*

**• 99½ per cent efficient . . .**

**• Saves over 30 man-hours on one separation**

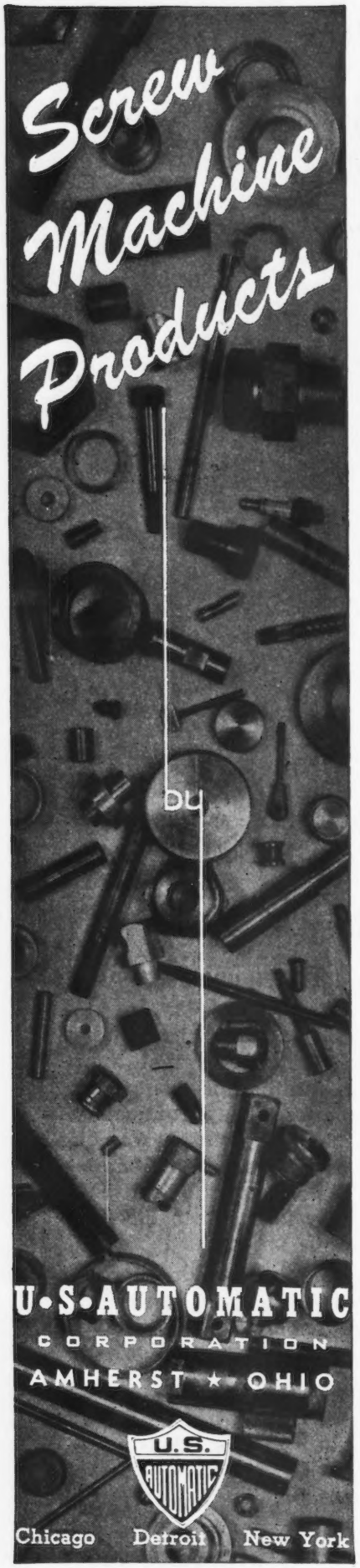
Mr. James F. Engle, chief metallurgist for the Zenith Radio Corporation, reports that their Dings DA Magnetic Separator does its job in about 20 minutes, as compared to approximately four hours when done manually by eight women —*and* that a 99½% recovery is effected. According to Mr. Engle, this has enabled the Dings DA Separator to actually pay for itself in the first three months of operation.

Dings makes a High Intensity Magnetic Separator to fit *your* needs—to do your separating job quicker and more economically. Write today for bulletins.

*World's Largest Exclusive Builders of Magnetic Equipment . . . Est. 1899*

**DINGS MAGNETIC SEPARATOR COMPANY**
**516 E. Smith Street Milwaukee 7, Wisconsin**

Dings MAGNETIC SEPARATION HIGH INTENSITY






engine, and may be included in the project.

It was revealed by General Electric that the engine for the P-80 is twice as powerful as those used on the earlier P-59A, which should make the craft truly remarkable from a performance standpoint. The craft about matched standard fighters, except from a range standpoint, the tremendous increase in power, if installed in a smaller fighter than the twin engine Bell built craft, should give unusual performance.

One indication of the performance is hinted at in the use of a new wing shape for maximum performance at speeds approaching the speed of sound, known to airmen as the "compressibility region."

Considerable emphasis has been placed by authorities on the ease of making an engine change, said to be possible in 15 minutes, possibly indicating that the stage of engine development is such that frequent changes under combat conditions are essential to continued operation.

## Deliveries Pose Problems

*Cincinnati*

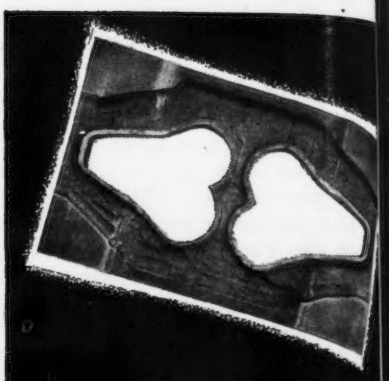
• • • With new business continuing at better than normal rate, deliveries of machine tools pose a worrisome problem. Although operations in district factories continue at present capacity, plants are not now manned as fully as during the hysterical ordering days of a year ago. While no figures are published, the present working forces are below the desired number—in some instances, as much as 40 to 50 per cent. Heavy inroads of selective service, combined with the customary wandering of employees has contributed to this reduction. Local WMC has helped to some extent, but labor now available must necessarily be trained first. In addition to labor shortage, local tool builders are bedevilled with material problems suppliers also having labor and other troubles that prevent delivery as needed and specified.

## Illinois Employment Rises

*Chicago*

• • • Employment in Illinois machinery and machine tool plants increased substantially between Dec. 15 and Jan. 15, according to the Illinois State Department of Labor.

Employment in the state in all reporting industries declined 1.6 per cent and payrolls 1.2 per cent, however, during that period.



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Made of ordinary carbon steel, 3" thick, it is constructed with a 3/16" x 3/16" ledge, cut into the top edge of the trimmer.

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COAST METALS
hard-facing weld rods
MAKE YOUR EQUIPMENT LAST LONGER

## *Reveals Automobile Industry's Part In Munition Production*

*Detroit*

• • • **Approximately 1000 plants** of the automotive industry have produced $24,000,000,000 worth of military requirements, and cumulative war orders received by them since Sept. 1, 1939, have been more than $32,000,000,000. These figures were reported in the 1944-45 issue of *Automobile Facts & Figures*, the year-book of the Automobile Manufacturers Association issued in March.

Employment in automobile body and parts factories last year averaged 694,000 men and women, and wages reached a new high in 1944, averaging $57.36 weekly per employee.

The 26th annual edition of the year book reveals that production of aircraft and equipment last year accounted for 45 per cent of the industry's $9,361,000,000 output. Military vehicles, 24.8 per cent, ranked second; tanks amounted to 12.1 per cent; marine equipment 7.8 per cent; guns 3.9 per cent; ammunition, 2.4 per cent; and other products, 3.2 per cent. Among the nation's ten largest metal working industries, the automotive industry ranked first, turning out 18.8 per cent of all war production in this category, exclusive of government-owned plants.

The book shows that 56c. out of every dollar received by prime contractors goes to sub-contractors and vendors. Located in 1375 cities, most of these are small business firms, two-thirds of them employing less than 500 workers apiece.

Reporting on automobiles, the publication estimated 25,608,400 passenger cars are registered, of which 17.4 per cent are 12 years or older. Despite the lack of new passenger cars to merchandise, 77 out of 100 motor vehicle dealers are still in business.

Production of 1,426,603 trucks during the past two years have brought total vehicle production by the automotive industry since the turn of the century to more than 88,000,000 units.

---

## Viergever Joins Luria Bros.

*Detroit*

• • • **Daniel M. Viergever**, WPB district salvage manager for Grand Rapids, has joined the Detroit office of Luria Bros. & Co., Inc. Earlier in the war he was in charge of the Michigan Scrap Processing branch of WPB.


ROLL ON ABBOTT Bearing BALLS

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Ⓐ Uninterrupted performance is the norm established by Design and Production Engineers . . .

Ⓐ Each part, each unit must have stamina . . . to withstand the gruelling load . . . to deliver precision-planned performance . . .

Ⓐ Tough specifications, these—but daily met by ABBOTT BEARING BALLS. They have the "built-in" stamina to carry the load as planned . . .

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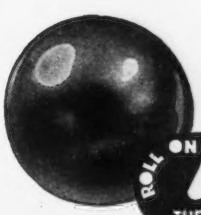

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## *Surplus Advisory Council Is Formed*

***Washington***

• • • An advisory council of 19 Government agencies has been named by the Surplus Property Board and will present views to the board on matters relating to the care, handling and disposal or surplus property.

While a similar group acted in an advisory capacity for the former SWPA, the Surplus Property Act of 1944 did not specify that an advisory board should be included in the new Surplus Property Board's set-up. Nevertheless, SPB said that it felt that the establishment of such a council would provide a useful forum in which these agencies could present their views on surplus matters.

The 19 agencies on the advisory council are: State Department, War Department, Navy Department, Justice Department, Department of the Interior, Procurement Division of the Treasury Department, United States Maritime Commission, RFC, WPB, OPA, Veterans Administration, FWA, Civil Aeronautics Board, SWPC, FEA, WFA, Department of Agriculture, NHA and Office of Contract Settlement.

## Steel Housing Gets Setback

(CONCLUDED FROM PAGE 105)

side slabs overhang the walls and are anchored against uplift by bolts connecting with the steel beams.

A roof in zinc sheeting, insulated with fibre-board, or equivalent, is a possible alternative.

The external cladding can be of asbestos cement, brick or enamelled steel sheet, while the internal linings are of insulating plywood, fibre-board, or glazed asbestos. Ceilings are of cellular plywood or fibre-board. The floors are of stiffened plywood panels laid on sound insulation strips on the beams, and the underside of the ground floor is treated with preservative.

The insulation is of slag wool or Isoflax fibre-boards, the windows of the metal casement type in metal subframes. The doors are of flush panel timber set in metal frames. The completely fitted kitchen is equipped with boiler, sink, cooker and refrigerator with ample cupboards.

### AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

**YEAR 1945**

Based on Reports by Companies which in 1944 made 97.1% of the Open Hearth, 100% of the Bessemer and 84.2% of the Electric Ingot and Steel for Castings Production

| Period | Estimated Production—All Companies | | | | | | | | Calculated weekly production, all companies (Net tons) | Number of weeks in month |
|---|---|---|---|---|---|---|---|---|---|---|
| | OPEN HEARTH | | BESSEMER | | ELECTRIC | | TOTAL | | | |
| | Net tons | Percent of capacity | Net tons | Percent of capacity | Net tons | Percent of capacity | Net tons | Percent of capacity | | |
| *January | 6,468,814 | 90.5 | 379,062 | 76.0 | 356,427 | 76.8 | 7,204,303 | 88.8 | 1,626,253 | 4.43 |
| †February | 5,966,501 | 92.4 | 347,202 | 77.0 | 344,000 | 82.2 | 6,657,703 | 90.9 | 1,664,426 | 4.00 |
| March | | | | | | | | | | 4.43 |
| *1st Quarter* | | | | | | | | | | *12.86* |
| April | | | | | | | | | | 4.29 |
| May | | | | | | | | | | 4.43 |
| June | | | | | | | | | | 4.3 |

**YEAR 1944**

Based on Reports by Companies which in 1943 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.9% of the Electric Ingot and Steel for Castings Production

| Period | Estimated Production—All Companies | | | | | | | | Calculated weekly production, all companies (Net tons) | Number of weeks in month |
|---|---|---|---|---|---|---|---|---|---|---|
| | OPEN HEARTH | | BESSEMER | | ELECTRIC | | TOTAL | | | |
| | Net tons | Percent of capacity | Net tons | Percent of capacity | Net tons | Percent of capacity | Net tons | Percent of capacity | | |
| January | 6,769,438 | 97.2 | 439,551 | 85.4 | 377,751 | 83.3 | 7,586,740 | 95.6 | 1,712,582 | 4.43 |
| February | 6,409,981 | 98.4 | 409,781 | 85.2 | 368,555 | 87.0 | 7,188,317 | 96.9 | 1,736,308 | 4.14 |
| March | 6,976,450 | 100.1 | 455,368 | 88.5 | 388,408 | 85.7 | 7,820,226 | 98.5 | 1,765,288 | 4.43 |
| *1st Quarter* | *20,155,869* | *98.6* | *1,304,700* | *86.4* | *1,134,714* | *85.3* | *22,595,283* | *97.0* | *1,738,099* | *13.00* |
| April | 6,788,433 | 100.6 | 437,472 | 87.8 | 362,118 | 82.5 | 7,588,023 | 98.7 | 1,768,770 | 4.29 |
| May | 6,878,251 | 98.7 | 437,444 | 85.0 | 380,960 | 84.0 | 7,696,655 | 97.0 | 1,737,394 | 4.43 |
| June | 6,462,108 | 95.8 | 419,699 | 84.2 | 347,028 | 79.0 | 7,228,835 | 94.1 | 1,685,043 | 4.29 |
| *2nd Quarter* | *20,128,792* | *98.4* | *1,294,615* | *85.6* | *1,090,106* | *81.9* | *22,513,513* | *96.6* | *1,730,478* | *13.01* |
| *1st 6 months* | *40,284,661* | *98.5* | *2,599,315* | *86.0* | *2,224,820* | *83.6* | *45,108,796* | *96.8* | *1,734,287* | *26.01* |
| July | 6,742,830 | 96.5 | 415,543 | 80.9 | 334,710 | 73.7 | 7,493,083 | 94.2 | 1,695,268 | 4.42 |
| August | 6,714,857 | 95.9 | 429,672 | 83.5 | 348,901 | 76.6 | 7,493,430 | 94.0 | 1,691,519 | 4.43 |
| September | 6,500,997 | 96.1 | 398,058 | 80.0 | 330,837 | 75.2 | 7,229,892 | 93.9 | 1,689,227 | 4.28 |
| *3rd Quarter* | *19,958,684* | *96.2* | *1,243,273* | *81.5* | *1,014,448* | *75.2* | *22,216,405* | *94.1* | *1,692,034* | *13.13* |
| *9 months* | *60,243,345* | *97.7* | *3,842,588* | *84.5* | *3,239,268* | *80.8* | *67,325,201* | *95.9* | *1,720,112* | *39.14* |
| October | 6,859,922 | 98.0 | 420,105 | 81.6 | 335,526 | 73.7 | 7,615,553 | 95.6 | 1,719,086 | 4.43 |
| November | 6,571,497 | 96.9 | 403,908 | 81.0 | 298,503 | 67.7 | 7,273,908 | 94.3 | 1,695,550 | 4.29 |
| December | 6,677,488 | 95.6 | 373,323 | 72.7 | 310,380 | 68.3 | 7,361,191 | 92.6 | 1,665,428 | 4.42 |
| *4th Quarter* | *20,108,907* | *96.9* | *1,197,336* | *78.4* | *944,409* | *69.9* | *22,250,652* | *94.1* | *1,693,353* | *13.14* |
| *2nd 6 months* | *40,067,591* | *96.5* | *2,440,609* | *80.0* | *1,958,857* | *72.6* | *44,467,057* | *94.1* | *1,692,693* | *26.27* |
| Total | 80,352,252 | 97.5 | 5,039,924 | 83.0 | 4,183,677 | 78.0 | 89,575,853 | 95.4 | 1,713,387 | 52.28 |

Note—The percentages of capacity operated are calculated on weekly capacities of 1,572,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944 as follows: Open hearth 82,223,610 net tons, Bessemer 6,024,000 net tons, Electric 5,350,350 net tons. Beginning July 1, 1944, the percentages of capacity operated are calculated on weekly capacities of 1,520,042 net tons open hearth, 116,182 net tons Bessemer and 102,757 net tons electric ingots and steel for castings, total 1,798,981 net tons; based on annual capacities as follows: Open hearth 82,504,600 net tons, Bessemer 6,074,000 net tons, Electric 5,372,150 net tons.

# Pricing Policy May Undergo Revision to Promote Sales of Surpluses

*Washington*

• • • **The so-called** Clayton formula for machine tool pricing may undergo revision if it is discovered by officials of RFC that the depreciation values set up by the old SWPA are a deterrent to buyers of government-owned tools.

Although Army limitations on industry now prevent many such purchases because reconversion is under strict ban officials report evidences of the fact that government prices are too high on tools which range from 85 per cent of the value on tools one month old, to 45.2 per cent of the value of tools three years or older to purchasers not using the tools.

Some of this evidence, officials say, lies in the fact that machine tool companies have on the drawing boards and ready for production improved designs at lower than prewar prices. This factor taken with the fact that production officials are expecting a great many tools to be declared surplus after VE-Day—the residue of what manufacturers have called a war made 40-year supply at normal rates of use.

The result of high government prices and excess supplies of tools and a fairly high obsolescence rate, may leave the government holding the bag with a great many tools that not even foreign countries may want because of improved design at lower price, some officials suggest.

Col. Joseph P. Woodlock, manager of the RFC sales division, said recently that one way to get rid of excess tools owned by the government and at the same time improve the shops of the country, would be for the government to adopt a policy of trading on an even basis if necessary new government-owned tools to companies having outmoded equipment.

The old machine tools might then be reconditioned by their original manufacturers and sold to countries where workers are not accustomed to precision standards generally prevailing in the United States. After the best of the government-owned tools had been made available to American industry, surpluses could be disposed of in countries which more nearly approach American precision standards.

This would have the effect of concentrating the sales of latest designs in this country, modernizing American plants, providing work for machine tool companies in the reconditioning business and selling tools to the rest of the world which are best suited to their needs, Colonel Woodlock pointed out.

What few government-owned tools that are now being sold for other than war use may be bought on five-year credit and as little as a 20 per cent down payment is required. Purchasers allowed to buy tools on credit must have satisfactory credit ratings. The leasing of tools, although not widely publicized, is also being done by RFC.

The RFC, Maritime Commission, Army and Navy and WPB have established a machine tool trading pit whereby tools surplus to one agency are sold or transferred to another. A review committee meets daily at 11 o'clock in the morning in the offices of the RFC in Washington, and similar meetings are held in the 23 RFC disposal offices in the field.

The purpose of the pit is to eliminate the purchase of critical tools when they are already owned by the government. Transfers of tools between DPC projects are accomplished by book work, but transfers among other agencies are cash sales.

Transfers worked out in the field must be approved by the Review Committee in Washington.

## Flood Poses Problems

*Cincinnati*

• • • **The rampaging waters** of the Ohio River posed additional problems for district machine tool builders when flood waters rose to the near record height of 69.2 ft. last week. A number of plants in the immediate flood area suspended operations because of high water. Other plants were handicapped by high absenteeism because of inability of workers to get to their jobs or because of need to move their families from flooded homes. By mid-week, however, the crest was reached and the waters began to recede, as clear weather set in. In its present cramped delivery position, however, the loss of production during the flood forced further delay in shipment dates.


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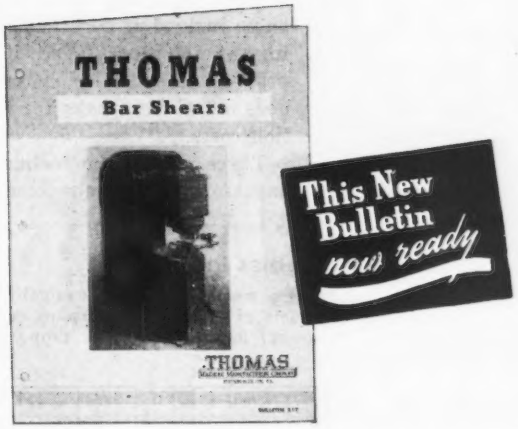
BENDING AND STRAIGHTENING MACHINES

PUNCHING AND SHEARING MACHINERY




This New Bulletin now ready

An indispensable machine in steel mills and machine shops for bar shearing operations. Of steel plate construction, and available in a number of sizes up to 3" diameter rounds.

*Write for Bulletin 317, illustrating and describing machine in detail.*

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MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

# MACHINE TOOLS



## Tool Builders See Thinning Of Ranks When Government Business Ends

*Cleveland*

• • • **Machine tool makers** here, now engaged in meeting schedules for munitions programs, are looking forward to postwar's multi-colored dawn with varied feelings, some of which are frankly pessimistic.

Obviously, the industry's prime postwar concern is the government owned surplus, which by the war's end will be a colossal number of machines, perhaps 700,000 or more, some of which will never have been removed from their skids.

On the assumption that surplus disposal will not be allocated to regular channels, as has been both suggested and discussed, the industry is left with a choice of little more than making new products not necessarily allied, and further improvement of established lines.

Already, companies here have quietly announced their intentions to enter new fields as an adjunct to their machine tool making. Others feel that export trade beckons and perhaps they have something here, but beneath it all there seems to be a feeling of pronounced p e s s i m i s m regarding standard machine tool building.

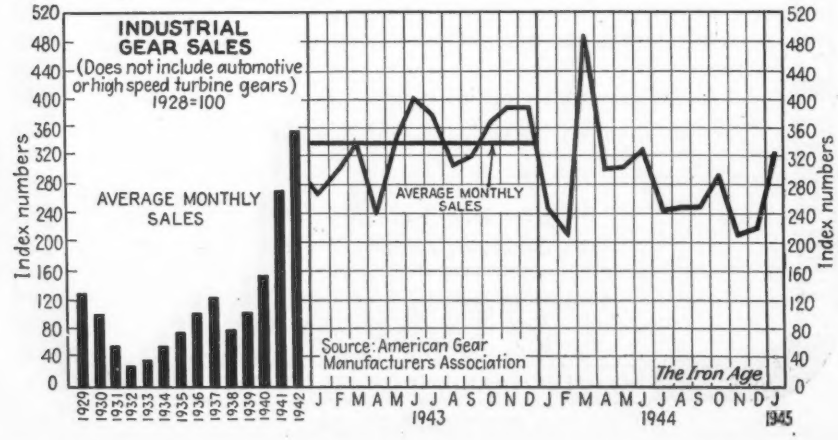
Recently, the statement was made here that the machine tool industry has been over exploited and has now reached the threshold of the gadget age. And there is a grain of truth in this. Most production on machine tools in this war has been a matter of tooling and not of machine tools. It can be safely said that manufacturers do need good, new, machine tools with up to date feeds and speeds, but most of the problems from there on can be solved with special tooling, which scarcely paints a rosy picture for special purpose equipment, and improvements on established lines must be more than minor.

Another factor in the postwar picture, as one executive has pointed out, is that many manufacturers are going to find that four or five or six years of war production have imbued them with bad habits, in an effort to meet schedules, costs have gone with the wind. But one of these days peacetime will pose its old familiar problems, including the factor of costs, and they will have to be met. Out of this will come the realization that they will have to get the best and most out of what they have first, for there will be no carload of DPC machinery waiting at the door. And it has been proved that special purpose equipment does not always make for low production costs.

There is also the feeling that perhaps some of the newcomers into the machine tool field are going to go. Created by the war, and with little or no experience with normal competition and markets, some of them have already found that doing business with the government can be a complicated affair. The big companies, of course, have made out and no one is worrying about their ability to survive.

### January Gear Sales Increase

**. . . The gearing industry, as represented by the members of the American Gear Manufacturers Association, shows an increase in volume of sales for January, as compared with December, of 47 per cent. This report does not include turbine or propulsion gearing. The index figure for January was 323.**




## Manpower Key to Screw Machine Production

*Washington*

• • • **Because of manpower** shortage, according to WPB officials it will not be possible to utilize fully additional facilities which have been found for expanding production of screw machine products. Officials made this announcement at a recent meeting of the Screw Machine Products Industry Advisory Committee.

Stepped-up programs for artillery fuses and boosters, mortar fuses, bomb fuses and other military items have greatly increased the requirements for screw machine products, WPB said. The industry has been of great assistance in locating additional facilities to undertake subcontracting work, but lack of set-up and tool men, and of semi-skilled and unskilled workers is still retarding production. Military programs will suffer even more than at present through shortages in screw machine products unless the skilled workers now in the industry can be retained, committee members said.

A representative of the WPB Steel Division informed the committee that the cold drawn steel supply situation will be very tight during the second and third quarters of 1945, with insufficient tonnage in sight to meet all requirements. The supply of brass rod will be adequate, a representative of the Copper Division reported.

## Arms Plant to Reopen

*Buffalo*

• • • **The Navy has** completed plans to place new war contracts in the Buffalo Arms plant though with a new firm. The plant had been closed by cutbacks of 50 cal. machine gun schedules according to a recent announcement by Senator James A. Mead.

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**SOLID TUNGSTEN CARBIDE COMMUTATOR SAWS!**

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# SUPER TOOL COMPANY

*Carbide Tipped Tools*

21650 Hoover Road, Detroit 13, Michigan ★ 4105 San Fernando Road, Glendale 4, California

# NON-FERROUS METALS

. . . News and Market Activities

## Copper Deliveries To Reach All Time High

*New York*

• • • **Copper producers estimate** that deliveries to their customers during April will reach an all-time high, provided sufficient labor is available at Metals Reserve Co. warehouses to permit shipments necessary to supplement mine production schedules. It is reported in the trade that within the space of a few months, government stocks of copper have dropped to about 300,000 short tons from the peak estimated to be 340,000 tons in December.

Some members of the industry believe that the defeat of Germany will result in cancellations of government contracts sufficient to reverse the trend and free up supplies.

•

## Weld Thin Wall Alloy Tubing

*East Troy, Wis.*

• • • **Thin wall tubing** fabricated by atomic hydrogen welding of stainless steel, nickel or high nickel alloys is produced by the Trent Tube Mfg. Co. here. Tubing as large as 7 in. in diameter can be fabricated by Trent with a wall thickness of only 0.015 in. Tubing with an outside diameter of ⅛ in., as welded, is produced and even smaller diameter tubes are redrawn from these.

•

## Lead Continues Tight

*New York*

• • • **Supplies of lead** are said by producers to be extremely tight even under the restrictions on use and inventory established by the revised lead order. It was the consensus of the trade some time ago that limitations imposed by the order were sufficiently drastic as to permit the accumulation of a reserve which might result in relaxation of certain restrictions. This has not proved to be the case and the Paint and Varnish Industry Advisory Committee of WPB has been informed recently by an official of the Tin, Lead & Zinc Division, that the drastic limitation of the use of lead for production of white lead will not be relaxed. The present lead stockpile of Metals Reserve Co. is estimated in the trade to approximate 65,000 tons.

Producers are of the opinion that the defeat of Germany will not cause any real modification of the supply-demand picture except to replace a limited amount of wartime uses with pent-up peacetime demand.

•

## Tin Outlook Prompts Further Restrictions

*Washington*

• • • **WPB estimates that** as much as two years may elapse before tin in quantity may be expected from the Malayan states in the East Indies, now in Japanese hands. The long delay expected in restoring the Malayan mines and smelters was made known with the announcement that it has again revised M-43 to tighten up on less essential uses for metal.

An important change in the revised order prohibits the use of tin in the manufacture of automobile solder, and also the use of any solder containing tin in the repair of automobile bodies and fenders. Another important change has been to spell out the uses of tin in coating or retinning certain utensils for processing or cooking of food by institutions or by industrial or commercial establishments. The use of tinplate has been limited to baking pans for institutional and commercial bakers. The order requires that certifications be furnished by retailers to their suppliers that they will only sell such items to institutions, industrial or commercial establishments and bakers. It is also required that suppliers must not sell such products to other than institutional and commercial users. Definite restrictions have been placed on the retailer governing purchases and sales of solder.

The order's babbitt metal schedule has been reworded, the most important change being that users of fabricated bearings containing babbitt of more than 12 per cent tin by weight, must furnish the manufacturer with a use certification. Schedule V of the order pertaining to use of tin to repair gas meters now requires that all repairs must be made with tin or tin alloys derived from scrap from old meters brought in for repairs or salvage.

## WPB Restricts Zinc In Spot Authorizations

*Washington*

• • • **Zinc for products** previously authorized under spot authorizations will be subject to restrictions of the recent zinc order renewing allocation controls after April 1. WPB's action in assuming control over zinc used for spot authorizations was taken through amendment to M-11-b.

Since Sept. 5, 1944, all requests for exemptions from restrictions of M-11-b were filed under PR-25 (spot authorizations). New appeals subsequent to March 7, 1945, should be filed with WPB field offices.

•

## Dr. Jeffries Values Tungsten

*New York*

• • • **Dr. Zay Jeffries said recently** that the General Electric Co. could afford to pay $330,000 per lb. for tungsten for use in preference to the old-fashioned carbon filament because of the superior efficiency of tungsten for this purpose. Dr. Jeffries delivered the annual lecture sponsored by the Powder Metallurgy Laboratory of Stevens Institute of Technology at Hoboken. He received a medal made of powdered metal which was awarded for outstanding work in the field of powder metallurgy.

•

## Indium Price Reduction

*New York*

• • • **The price of indium has come** down another half dollar recently to $4 per troy ounce for 99.9 per cent purity.

The price of this metal has been dropping rapidly ever since its first large scale production in Kingman, Ariz., in 1935. Prior to that time those working with the metal paid as much as $10 per gram for use in developmental work.

The current relatively low price of indium is the result of its greatly expanded use encouraged by the war production program. This metal is used in minute quantities in certain bearing alloys and also for some plating applications.

## Primary Metals

*(Cents per lb., unless otherwise noted)*

| | |
|---|---|
| Aluminum, 99+%, del'd (Min. 10,000 lb.) | 15.00 |
| Antimony, American, Laredo, Tex. | 14.50 |
| Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be | $17.00 |
| Cadmium, del'd | 90.00 |
| Cobalt, 97-99% (per lb.) | $1.50 to $1.57 |
| Copper, electro, Conn. valley | 12.00 |
| Copper, electro, New York | 11.75 |
| Copper, lake | 12.00 |
| Gold, U. S. Treas., dollars per oz. | $35.00 |
| Indium, 99.9%, dollars per troy oz. | $4.00 |
| Iridium, dollars per troy oz. | $120.00 |
| Lead, St. Louis | 6.35 |
| Lead, New York | 6.50 |
| Magnesium, 99.9 + %, carlots | 20.50 |
| Magnesium, 12-in. sticks, carlots | 27.50 |
| Mercury, dollars per 76-lb. flask, f.o.b. New York | $163.00 to $168.00 |
| Nickel, electro | 35.00 |
| Palladium, dollars per troy oz. | $24.00 |
| Platinum, dollars per oz. | $35.00 |
| Silver, open market, New York, cents per oz. | 44.75 |
| Tin, Straits, New York | 52.00 |
| Zinc, East St. Louis | 8.25 |
| Zinc, New York | 8.65 |

## Remelted Metals

*(Cents per lb. unless otherwise noted)*

| | |
|---|---|
| Aluminum, No. 12 Fdy. (No. 2) | 9.00 to 10.00 |
| Aluminum, deoxidizing No. 2, 3, 4 | $6.00 to 9.50 |
| Brass Ingot | |
| 85-5-5-5 (No. 115) | 13.25 |
| 88-10-2 (No. 215) | 16.75 |
| 80-10-10 (No. 305) | 16.00 |
| No. 1 Yellow (No. 405) | 10.25 |

## Copper, Copper Base Alloys

*(Mill base, cents per lb.)*

| | Extruded Shapes | Rods | Sheets |
|---|---|---|---|
| Copper | 20.87 | .... | 20.37 |
| Copper, H.R. | .... | 17.37 | .... |
| Copper drawn | .... | 18.37 | .... |
| Low brass, 80% | .... | 20.40 | 20.15 |
| High brass | .... | .... | 19.48 |
| Red brass, 85% | .... | 20.61 | 20.36 |
| Naval brass | 20.37 | 19.12 | 24.50 |
| Brass, free cut | .... | 15.01 | .... |
| Commercial bronze, 90% | .... | 21.32 | 21.07 |
| Commercial bronze, 95% | .... | 21.53 | 21.28 |
| Manganese bronze | 24.00 | .... | 28.00 |
| Phos. bronze, A, B, 5% | .... | 36.50 | 36.25 |
| Muntz metal | 20.12 | 18.87 | 22.75 |
| Everdur, Herculoy, Olympic or equal | .... | 25.50 | 26.00 |
| Nickel silver, 5% | .... | 28.75 | 26.50 |
| Architect bronze | 19.12 | .... | .... |

## Aluminum

*(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)*

*Tubing:* 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

*Plate:* 0.250 in. and heavier; 2S and 3S, 21.2c.; 52s, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

*Flat Sheet:* 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

*Extruded Shapes:* "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

*Wire Rod and Bar:* Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

## Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

# NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

## Copper, Copper Base Alloys

### *OPA Group 1*†

| | |
|---|---|
| No. 1 wire, No. 1 heavy copper | 9.75 |
| No. 1 tinned copper wire, No. 1 tinned heavy copper | 9.75 |
| No. 2 wire, mixed heavy copper | 8.75 |
| Copper tuyeres | 8.75 |
| Light copper | 7.75 |
| Copper borings | 9.75 |
| No. 2 copper borings | 8.75 |
| Lead covered copper wire, cable | 6.00* |
| Lead covered telephone, power cable | 6.04 |
| Insulated copper | 5.10* |

### *OPA Group 2*†

| | |
|---|---|
| Bell metal | 15.50 |
| High grade bronze gears | 13.25 |
| High grade bronze solids | 11.50* |
| Low lead bronze borings | 11.50* |
| Babbitt lined brass bushings | 13.00 |
| High lead bronze solids | 10.00* |
| High lead bronze borings | 10.00* |
| Red trolley wheels | 10.75 |
| Tinny (phosphor bronze) borings | 10.50 |
| Tinny (phosphor bronze) solids | 10.50 |
| Copper-nickel solids and borings | 9.25 |
| Bronze paper mill wire cloth | 9.50 |
| Aluminum bronze solids | 9.00 |
| Soft red brass (No. 1 composition) | 9.00 |
| Soft red brass borings (No. 1) | 9.00 |
| Gilding metal turnings | 8.50 |
| Contaminated gilded metal solids | 8.50 |
| Unlined standard red car boxes | 8.25 |
| Lined standard red car boxes | 7.75 |
| Cocks and faucets | 7.75 |
| Mixed brass screens | 7.75 |
| Red brass breakage | 7.50 |
| Old nickel silver solids, borings | 6.25 |
| Copper lead solids, borings | 6.25 |
| Yellow brass castings | 6.25 |
| Automobile radiators | 7.00 |
| Zincy bronze borings | 8.00 |
| Zincy bronze solids | 8.00 |

### *OPA Group 3*†

| | |
|---|---|
| Fired rifle shells | 8.25 |
| Brass pipe | 7.50 |
| Old rolled brass | 7.00 |
| Admiralty condenser tubes | 7.50 |
| Muntz metal condenser tubes | 7.00 |
| Plated brass sheet, pipe reflectors | 6.50 |
| Manganese bronze solids | 7.35[1] |
| Manganese bronze solids | 6.25[2] |
| Manganese bronze borings | 6.50[1] |
| Manganese bronze borings | 5.50[2] |

### *OPA Group 4*†

| | |
|---|---|
| Refinery brass | 4.75* |

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

## Other Copper Alloys

| | |
|---|---|
| Briquetted Cartridge Brass Turnings | 8.625 |
| Cartridge Brass Turnings, Loose | 7.875 |
| Loose Yellow Brass Trimmings | 7.875 |

## Aluminum

### *Plant scrap, segregated*

| | |
|---|---|
| 2S solids | 8.00 |
| Dural alloys, solids 14, 17, 18, 24S 25S | 5.00 |
| turnings, dry basis | 3.00 |
| Low copper alloys 51, 52, 61, 63S solids | 7.50 |
| turnings, dry basis | 5.75 |

### *Plant scrap, mixed*

| | |
|---|---|
| Solids | 4.00 |
| Turnings, dry basis | 2.50 |

### *Obsolete scrap*

| | |
|---|---|
| Pure cable | 8.00 |
| Old sheet and utensils | 6.00 |
| Old castings and forgings | 5.00 |
| Pistons, free of struts | 5.00 |
| Pistons, with struts | 3.00 |
| Old alloy sheet | 5.00 |

## Magnesium*

### *Segregated plant scrap*

| | |
|---|---|
| Pure solids and all other solids, exempt | |
| Borings and turnings | 1.50 |

### *Mixed, contaminated plant scrap*

| | |
|---|---|
| Grade 1 solids | 3.00 |
| Grade 1 borings and turnings | 2.00 |
| Grade 2 solids | 2.00 |
| Grade 2 borings and turnings | 1.00 |

*Nominal.

## Zinc

| | |
|---|---|
| New zinc clippings, trimmings | 6.50 |
| Engravers, lithographers plates | 6.50 |
| Old zinc scrap | 4.75 |
| Unsweated zinc dross | 5.00 |
| Die cast slab | 4.50 |
| New die cast scrap | 4.45 |
| Radiator grilles, old and new | 3.50 |
| Old die cast scrap | 3.00 |

## Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

## Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb contained Ni.

# ELECTROPLATING ANODES AND CHEMICALS

### *Anodes*

*(Cents per lb., f.o.b. shipping point)*

| | |
|---|---|
| Copper: Cast, elliptical, 15 in. and longer | 25⅛ |
| Electrolytic, full size | 22⅞ |
| cut to size | 30⅛ |
| Rolled, oval, straight, 15 in. and longer | 23¼ |
| Curved | 24¼ |
| Brass Cast, 82-20, elliptical, 15 in. and longer | 23⅝ |
| Zinc: Cast, 99.99, 16 in. and over. | 16¼ |
| Nickel: 99% plus, cast | 47 |
| Rolled, depolarized | 48 |
| Silver: Rolled, 999 fine per Troy (1-9) oz., per oz. | 58 |

### *Chemicals*

*(Cents per lb., delivery from New York)*

| | |
|---|---|
| Copper cyanide, tech., 100-lb. bbls. 1-5 | 5.65 |
| Copper sulphate, 99.5 crystals, bbls. | 13.00-13.50 |
| Nickel salts, single, 425-lb. bbls. | 34.00 |
| Silver cyanide, 100 oz. lots | 40.82-41.125 |
| Sodium cyanide, 96% dom., 100-lb. dms. | 0.15 |
| Zinc, cyanide, 100-lb. dms. | 33.00 |
| Zinc, sulphate, 89% crystals, bbls. | 6.80 |

# SCRAP



## Reported Action on Manpower Confirmed

### New York

• • • For the past several weeks reports have been coming out of the scrap districts about action by regional offices of WMC in transferring scrap yard labor from the essential to the critical category. Selective Service national headquarters sent a memorandum, No. 167, on February 21 to regional Directors of Selective Service which has had the effect of dissolving the standpoint that since scrap was in the lower case-essential category, men under thirty years of age should not receive the same consideration for deferment as workers in steel and related industries which are considered critical. As a result of this memorandum local draft boards throughout the country are, at their discretion, placing scrap yard labor in the critical category. The regional office of Selective Service in New York reports that its memorandum, No. 115, to local boards in this area calls for certification of men from 18 to 29 years by the procurement agency of government before deferment. In the case of scrap labor this would be the regional office of WPB.

There is little change in the market price-wise this week except that, significantly enough, turnings are up in Detroit and St. Louis and open hearth grades in Los Angeles. Only in Buffalo is there a downward price movement and this is confined to turnings.

•

*CHICAGO*—A still greater tendency by mills to hold large commitments in abeyance has resulted in a continuation of the previously existing price structure. Some purchases have been made locally for current requirements, carefully specified as to source and delivery, but these have resulted in price confirmation only on secondary open hearth grades. Until fresh major tonnages change hands locally, no market trend can be determined. War developments appear to have added no further weakness and although there is a noticeable tendency to avoid long term commitments, there have been few cancellations and little outstanding tonnage to cancel.

•

*DETROIT* — Firmness developed this week in the turnings market caused by a sale at higher prices than have prevailed in the recent past. There was considerable uncertainty, however, over whether this level would be held due to widespread premiums and discounts based on absence or presence of alloy content in very minor proportions. Cast continues exceptionally scarce and melting grades for open hearth remain solidly pegged at ceiling.

•

*PITTSBURGH*—The pressure is easing here considerably on scrap, probably because of the war news. However, none of the buyers seem bearish, apparently fearing to be caught again in the same position they were in during January. The car situation is not good, but it is improving. Much scrap is damming up in plants that generate it because any cars that come in are loaded with finished goods rather than scrap. This flood of scrap is a potential market breaker if and when the car situation eases to the point that they are readily available.

•

*ST. LOUIS*—An improvement in the movement of scrap iron to the St. Louis industrial district from the rural districts is reported, with better weather conditions prevailing. There is still a shortage of manpower to process the material. Some offerings on a speculative basis are being made to the mills on ceiling prices by factors who see they have nothing to lose by such transactions and much to gain if the market should break.

•

*BOSTON*—Miscellaneous lots are moving via rail, largely to eastern Pennsylvania, and truckloads of special steels to nearby points. Heavy melting steel is slightly more plentiful, but cars are lacking. Estimates are that not more than four foundries in this territory have 60-days' supply of scrap. All will take one, two, three tons, anything they can get. There are almost no plant dismantlings, and all lots of heavy cast have been absorbed. Turnings prices don't go up or down, but the market still looks weak.

•

*BUFFALO*—The light end of the scrap list became sloppier this week, with all turnings and borings $1.25 a ton below ceilings. The amount of business at the lower prices—representing an actual reduction of $1.75 since brokerage fees were not allowed—was small and doubts were expressed by some dealers that any substantial tonnage could be bought at these figures. In sharp contrast is the strong demand for heavy melting material, with the manpower pinch a major factor in restricting output of yards. A hydraulic press that was put out of commission late last fall by a fire in a local yard is expected to be returned to the active list shortly, providing an additional outlet for light scrap. One consumer reports railroad scrap purchased in January still undelivered, an annoying aftermath of the severe storms that upset schedules of the carriers and mills in January and February.

•

*CLEVELAND*—Mills are in the worst shape here now than they have been at any time since the start of the war due to lack of scrap. Open hearth scrap is practically non-existent. Lack of transportation and preparation facilities, including the manpower shortage, continue to bog down the movement of scrap in this area. Dealers and mills see no relief in sight except the defeat of Germany which they hope may free supplies.

•

*NEW YORK*—The movement of scrap iron and steel has been accelerated to some extent in this area since the advent of milder weather, but mills and foundries are reported to be still badly in need of scrap supplies. All grades continue to sell at ceilings here. Dealers, when discussing the yard labor problem, are inclined to be skeptical of the effectiveness of WMC moves to establish, at this late date, greater preferences for yard labor in Selective Service procedure. In considering the impact of the war news on the scrap market, it is conceded by some dealers that the defeat of Germany will undoubtedly cause government cancellation of some contracts which may be expected to result in cancellation of mill orders. Dealers feel that, having learned from recent experience, there probably will not be any moves by government or mills calculated to anticipate victory.

•

*PHILADELPHIA* — Rate of shipments has improved this week. However, the backlog of prepared scrap that accumulated in dealers' yards during the weeks of the embargo and even after when railroads were having difficulty in assigning freight cars to the yards has been pretty well cleared and shipments may slow down again. The freight car shortage has hardly improved. The scarcity of open hearth grades has caused some mills to get permission to use low phos in the open hearth which is certainly a case of where there is no bread, let them eat cake. This may result in a tightening of low phos supplies since that material, although not in the scarcity group, has not been overly plentiful.

•

*CINCINNATI* — Dealers indicate that the demand for good low phos and cast grades of scrap continues strong with the supply none too plentiful. Mills, on the other hand, are taking what scrap is available on contract and while they are reported to be eating into their inventories rather substantially, no great buying effort is coming from this source. Labor supply continues to cramp preparation and availability of good scrap and the recent flood in the area, combined with a shortage in railroad cars, adds to the tightness of the situation. Turnings continue weak, but prices on other types of scrap are unchanged.

•

*BIRMINGHAM* — Supplies of material available in this market are limited and shipments are slow. Manpower shortages have reached a new low here and they are seriously affecting both the collection and delivery of scrap.

# IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

## PITTSBURGH

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $20.00* |
| RR. hvy. melting | 21.00* |
| No. 2 hvy. melting | 20.00* |
| RR. scrap rails | 21.50* |
| Rails 3 ft. and under | 23.50* |
| No. 1 comp'd sheets | 20.00* |
| Hand bdld. new shts. | 20.00* |
| Hvy. axle turn. | 19.50* |
| Hvy. steel forge turn. | 19.50* |
| Mach. shop turn. | $13.00 to 13.50 |
| Short shov. turn. | 15.50 to 16.00 |
| Mixed bor. and turn. | 13.00 to 13.50 |
| Cast iron borings | 15.50 to 16.00 |
| Hvy. break. cast | 16.50* |
| No. 1 cupola | 20.00* |
| RR. knuck. and coup. | 24.50* |
| RR. coil springs | 24.50* |
| Rail leaf springs | 24.50* |
| Rolled steel wheels | 24.50* |
| Low phos. bil. crops | 25.00* |
| Low phos. | 22.50* |
| RR. malleable | 22.00* |

## CHICAGO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $18.75* |
| No. 2 hvy. melting | 18.75* |
| No. 1 bundles | 18.75* |
| No. 2 dealers' bndls. | $16.25 to 16.75 |
| Galv. bundles | 14.25 to 14.75 |
| Mach. shop turn. | 8.50 to 9.00 |
| Short shovel. turn. | 9.25 to 9.75 |
| Cast iron borings | 9.25 to 9.75 |
| Mix. borings & turn. | 9.25 to 9.75 |
| Low phos. hvy. forge | 23.75* |
| Low phos. plates | 21.25* |
| No. 1 RR. hvy. melt. | 19.75* |
| Reroll rails | 22.25* |
| Miscellaneous rails | 20.25* |
| Rails 3 ft. and under | 22.25* |
| Locomotive tires, cut | 24.25* |
| Cut bolsters & side frames | 22.25* |
| Angles & splice bars | 22.25* |
| Standard stl. car axles | 25.75* |
| No. 3 steel wheels | 22.75 to 23.25 |
| Couplers & knuckles | 23.25* |
| Agricul. malleable | 22.00* |
| RR. malleable | 22.00* |
| No. 1 mach. cast | 20.00* |
| No. 1 agricul. cast | 20.00* |
| Hvy. breakable cast | 16.50* |
| RR. grate bars | 15.25* |
| Cast iron brake shoes | 15.25* |
| Stove plate | 19.00* |
| Clean auto cast | 20.00* |
| Cast iron carwheels | 20.00* |

## CINCINNATI

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $19.50* |
| No. 2 hvy. melting | 19.50* |
| No. 1 bundles | 19.50* |
| No. 2 bundles | 19.50* |
| Mach. shop turn. | $8.50 to 9.00 |
| Shoveling turn. | 16.50* |
| Cast iron borings | 8.50 to 9.50 |
| Mixed bor. & turn. | 8.50 to 9.50 |
| Low phos. plate | 22.00* |
| No. 1 cupola cast | 20.00* |
| Hvy. breakable cast | 16.50* |
| Stove plate | 19.00* |
| Scrap rails | 21.50* |

## BOSTON

**Dealers' buying prices per gross ton, f.o.b. cars**

| | |
|---|---|
| No. 1 hvy. melting | $15.05* |
| No. 2 hvy. melting | 15.05* |
| No. 1 and 2 bundles | 15.05* |
| Busheling | 15.05* |
| Turnings, shovelings | $11.00 to 11.06 |
| Machine shop turn. | 9.00 to 9.06 |
| Mixed bor. & turn. | 9.00 to 9.06 |
| Cl'n cast, chem. bor. | 13.06 to 14.15* |
| *Truck delivery to foundry* | |
| Machinery cast | 21.00 to 23.51* |
| Breakable cast | 21.57 to 21.87* |
| Stove plate | 20.00 to 23.51* |

## DETROIT

**Per gross ton, brokers' buying prices:**

| | |
|---|---|
| No. 1 hvy. melting | $17.32* |
| No. 2 hvy. melting | 17.32* |
| No. 1 bundles | 17.32* |
| New busheling | 17.32* |
| Flashings | 17.32* |
| Mach. shop turn. | $9.00 to 9.50 |
| Short shov. turn. | 10.50 to 11.50 |
| Cast iron borings | 9.75 to 10.25 |
| Mixed bor. & turn. | 9.00 to 9.50 |
| Low phos. plate | 19.82* |
| No. 1 cupola cast | 20.00* |
| Charging box cast | 18.00 to 19.00 |
| Hvy. breakable cast | 16.50* |
| Stove plate | 18.50 to 19.00 |
| Automotive cast | 20.00* |

## PHILADELPHIA

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $18.75* |
| No. 2 hvy. melting | 18.75* |
| No. 2 bundles | 18.75* |
| Mach. shop turn. | 13.75* |
| Shoveling turn. | 15.75* |
| Cast iron borings | 14.75* |
| Mixed bor. & turn. | 13.75* |
| No. 1 cupola cast | 20.00* |
| Hvy. breakable cast | 16.50* |
| Cast, charging box | 19.00* |
| Hvy. axle, forge turn. | 18.25* |
| Low phos. plate | 21.25* |
| Low phos. punchings | 21.25* |
| Billet crops | 21.25* |
| RR. steel wheels | 23.25* |
| RR. coil springs | 23.25* |
| RR. malleable | 22.00* |

## ST. LOUIS

**Per gross ton delivered to consumer:**

| | |
|---|---|
| Heavy melting | $17.50* |
| Bundled sheets | 17.50* |
| Mach. shop turn. | $7.00 to 7.50 |
| Hvy. axle turn. | 15.50 to 16.00 |
| Locomotive tires, uncut | 20.00 |
| Misc. std. sec. rails | 19.00* |
| Rerolling rails | 21.00* |
| Steel angle bars | 21.00* |
| Rails 3 ft. and under | 21.50* |
| RR. springs | 22.00* |
| Steel car axles | 23.50* |
| Stove plate | 19.00* |
| Grate bars | 15.25* |
| Brake shoes | 15.25* |
| RR. malleable | 22.00* |
| Cast iron carwheels | 18.50* |
| No. 1 mach'ery cast | 20.00* |
| Breakable cast | 16.50* |

## BIRMINGHAM

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $17.00* |
| No. 2 hvy. melting | 17.00* |
| No. 2 bundles | 17.00* |
| No. 1 busheling | 17.00* |
| Long turnings | $9.50 to 10.00 |
| Cast iron borings | 9.50 to 10.00 |
| Bar crops and plate | 19.50* |
| Structural and plate | 19.50* |
| No. 1 cast | 20.00* |
| Stove plate | 17.00 |
| Steel axles | 18.00* |
| Scrap rails | 18.50 |
| Rerolling rails | 20.50* |
| Angles & splice bars | 20.50* |
| Rails 3 ft. & under | 21.00* |
| Cast iron carwheels | 16.50 to 17.00 |

## YOUNGSTOWN

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $20.00* |
| No. 2 hvy. melting | 20.00* |
| Low phos. plate | 22.50* |
| No. 1 busheling | 20.00* |
| Hydraulic bundles | 20.00* |
| Mach. shop turn. | $13.00 to 13.50 |
| Short shovel. turn. | 15.00 to 15.50 |
| Cast iron borings | 14.00 to 14.50 |

## NEW YORK

**Dealers' buying prices per gross ton, on cars**

| | |
|---|---|
| No. 1 hvy. melting | $15.33* |
| No. 2 hvy. melting | 15.33* |
| Comp. black bundles | 15.33* |
| Comp. galv. bundles | 13.33* |
| Mach. shop turn. | 10.33* |
| Mixed bor. & turn. | 10.33* |
| No. 1 cupola cast | 20.00* |
| Hvy. breakable cast | 16.50* |
| Charging box cast | 19.00* |
| Stove plate | 19.00* |
| Clean auto cast | 20.00* |
| Unstrip. motor blks. | 17.50* |
| Cl'n chem. cast bor. | 14.33* |

## BUFFALO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $19.25* |
| No. 1 bundles | 19.25* |
| No. 2 bundles | 19.25* |
| No. 2 hvy. melting | 19.25* |
| Mach. shop turn. | 13.00 |
| Shoveling turn. | 15.00 |
| Cast iron borings | 14.00 |
| Mixed bor. & turn. | 13.00 |
| No. 1 cupola cast | 20.00* |
| Stove plate | 19.00* |
| Low phos. plate | 21.75* |
| Scrap rails | 20.75* |
| Rails 3 ft. & under | 22.75* |
| RR. steel wheels | 23.75* |
| Cast iron car wheels | 20.00* |
| RR. coil & leaf spgs. | 23.75* |
| RR. knuckles & coup. | 23.75* |
| RR. malleable | 22.00* |
| No. 1 busheling | 19.25* |

## CLEVELAND

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $19.50* |
| No. 2 hvy. melting | 19.50* |
| Compressed sheet stl. | 19.50* |
| Drop forge flashings | 19.00* |
| No. 2 bundles | 19.50* |
| Mach. shop turn. | $12.50 to 13.00 |
| Short shovel. | 14.50 to 15.00 |
| No. 1 busheling | 19.50* |
| Steel axle turn. | 19.00* |
| Low phos. billet and bloom, crops | 24.50* |
| Cast iron borings | 13.50 to 14.00 |
| Mixed bor. & turn. | 12.50 to 13.00 |
| No. 2 busheling | 17.00* |
| No. 1 machine cast | 20.00* |
| Railroad cast | 20.00* |
| Railroad grate bars | 15.25* |
| Stove plate | 19.00* |
| RR. hvy. melting | 20.50* |
| Rails 3 ft. & under | 23.00* |
| Rails 18 in. & under | 24.25* |
| Rails for rerolling | 23.00* |
| Railroad malleable | 22.00* |
| Elec. furnace punch | 22.00* |

## SAN FRANCISCO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| RR. hvy. melting | $15.50 to $16.25 |
| No. 1 hvy. melting | 15.50 to 16.25 |
| No. 2 hvy. melting | 14.50 to 15.25 |
| No. 2 bales | 13.50 to 14.25 |
| No. 3 bales | 9.50 to 10.59 |
| Mach. shop turn. | 7.00 |
| Elec. furn. 1 ft., und. | 15.50 to 17.00 |
| No. 1 cupola cast | 19.00 to 21.00 |

## LOS ANGELES

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $14.50 to $15.50 |
| No. 2 hvy. melting | 13.50 to 14.50 |
| No. 2 bales | 12.50 to 13.50 |
| No. 3 bales | 9.00 to 10.00 |
| Mach. shop turn. | 4.50 |
| No. 1 cupola cast | 19.00 to 21.00 |

## SEATTLE

**Per gross ton delivered to consumer:**

| | |
|---|---|
| RR. hvy. melting | $13.50 |
| No. 1 hvy. melting | 13.50 |
| No. 3 bundles | 11.50 |
| Elec. furn. 1 ft., und. | $16.00 to 17.00 |
| No. 1 cupola cast | 20.00* |

# Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.B. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 162-170.

| Flat Rolled Steel: (Cents Per Lb.) | Mar. 13, 1945 | Mar. 6, 1945 | Feb. 6, 1945 | Mar. 14, 1944 |
|---|---|---|---|---|
| Hot rolled sheets | 2.20 | 2.20 | 2.10 | 2.10 |
| Cold rolled sheets | 3.05 | 3.05 | 3.05 | 3.05 |
| Galvanized sheets (24 ga.) | 3.65 | 3.65 | 3.50 | 3.50 |
| Hot rolled strip | 2.10 | 2.10 | 2.10 | 2.10 |
| Cold rolled strip | 2.80 | 2.80 | 2.80 | 2.80 |
| Plates | 2.20 | 2.20 | 2.10 | 2.10 |
| Plates, wrought iron | 3.80 | 3.80 | 3.80 | 3.80 |
| Stain's c.r. strip (No. 302) | 28.00 | 28.00 | 28.00 | 28.00 |
| **Tin and Terne Plate: (Dollars Per Base Box)** | | | | |
| Tin plate, standard cokes | $5.00 | $5.00 | $5.00 | $5.00 |
| Tin plate, electrolytic | 4.50 | 4.50 | 4.50 | 4.50 |
| Special coated mfg. ternes | 4.30 | 4.30 | 4.30 | 4.30 |
| **Bars and Shapes: (Cents Per Lb.)** | | | | |
| Merchant bars | 2.15 | 2.15 | 2.15 | 2.15 |
| Cold finished bars | 2.65 | 2.65 | 2.65 | 2.65 |
| Alloy bars | 2.70 | 2.70 | 2.70 | 2.70 |
| Structural shapes | 2.10 | 2.10 | 2.10 | 2.10 |
| Stainless bars (No. 302) | 24.00 | 24.00 | 24.00 | 24.00 |
| Wrought iron bars | 4.40 | 4.40 | 4.40 | 4.40 |
| **Wire and Wire Products: (Cents Per Lb.)** | | | | |
| Plain wire | 2.60 | 2.60 | 2.60 | 2.60 |
| Wire nails | 2.80 | 2.80 | 2.55 | 2.55 |
| **Rails: (Dollars Per Gross Ton)** | | | | |
| Heavy rails | $43.00 | $43.00 | $40.00 | $40.00 |
| Light rails | 43.00 | 43.00 | 40.00 | 40.00 |
| **Semi-Finished Steel: (Dollars Per Gross Ton)** | | | | |
| Rerolling billets | $34.00 | $34.00 | $34.00 | $34.00 |
| Sheet bars | 34.00 | 34.00 | 34.00 | 34.00 |
| Slabs, rerolling | 34.00 | 34.00 | 34.00 | 34.00 |
| Forging billets | 40.00 | 40.00 | 40.00 | 40.00 |
| Alloy blooms, billets, slabs | 54.00 | 54.00 | 54.00 | 54.00 |
| **Wire Rods and Skelp: (Cents Per Lb.)** | | | | |
| Wire rods | 2.00 | 2.00 | 2.00 | 2.00 |
| Skelp | 1.90 | 1.90 | 1.90 | 1.90 |

| Pig Iron: (Per Gross Ton) | Mar. 13, 1945 | Mar. 6, 1945 | Feb. 6, 1945 | Mar. 14, 1944 |
|---|---|---|---|---|
| No. 2 fdy., Philadelphia | $26.84 | $26.84 | $25.84 | $25.84 |
| No. 2, Valley furnace | 25.00 | 25.00 | 24.00 | 24.00 |
| No. 2, Southern Cin'ti | 26.11 | 26.11 | 25.11 | 23.94 |
| No. 2, Birmingham | 21.38 | 21.38 | 20.38 | 20.38 |
| No. 2, foundry, Chicago† | 25.00 | 25.00 | 24.00 | 24.00 |
| Basic, del'd eastern Pa. | 26.34 | 26.34 | 25.34 | 25.34 |
| Basic, Valley furnace | 24.50 | 24.50 | 23.50 | 23.50 |
| Malleable, Chicago† | 25.00 | 25.00 | 24.00 | 24.00 |
| Malleable, Valley | 25.00 | 25.00 | 24.00 | 24.00 |
| L. S. charcoal, Chicago | 37.34 | 37.34 | 37.34 | 37.34 |
| Ferromanganese‡ | 135.00 | 135.00 | 135.00 | 135.00 |

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡ For carlots at seaboard.

| Scrap: (Per Gross Ton) | | | | |
|---|---|---|---|---|
| Heavy melt'g steel, P'gh. | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt'g steel, Phila. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melt'g steel, Ch'go | 18.75 | 18.75 | 18.75 | 18.75 |
| No. 1 hy. comp. sheet, Det. | 17.32 | 17.32 | 17.32 | 17.85 |
| Low phos. plate, Youngs'n | 22.50 | 22.50 | 22.50 | 22.50 |
| No. 1 cast, Pittsburgh | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Philadelphia | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 20.00 |
| **Coke, Connellsville: (Per Net Ton at Oven)** | | | | |
| Furnace coke, prompt | $7.00 | $7.00 | $7.00 | $7.00 |
| Foundry coke, prompt | 8.25 | 8.25 | 8.25 | 8.25 |
| **Non-Ferrous Metals: (Cents Per Lb. to Large Buyers)** | | | | |
| Copper, electro., Conn. | 12.00 | 12.00 | 12.00 | 12.00 |
| Copper, Lake | 12.00 | 12.00 | 12.00 | 12.00 |
| Tin (Straits), New York | 52.00 | 52.00 | 52.00 | 52.00 |
| Zinc, East St. Louis | 8.25 | 8.25 | 8.25 | 8.25 |
| Lead, St. Louis | 6.35 | 6.35 | 6.35 | 6.35 |
| Aluminum, Virgin, del'd. | 15.00 | 15.00 | 15.00 | 15.00 |
| Nickel, electrolytic | 35.00 | 35.00 | 35.00 | 35.00 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 20.50 |
| Antimony, Laredo, Tex. | 14.50 | 14.50 | 14.50 | 14.50 |

# Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

| | FINISHED STEEL | PIG IRON | SCRAP STEEL |
|---|---|---|---|
| March 13, 1945 | 2.25839c. a Lb. | $24.61 a Gross Ton | $19.17 a Gross Ton |
| One week ago | 2.25839c. a Lb. | $24.61 a Gross Ton | $19.17 a Gross Ton |
| One month ago | 2.25839c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |
| One year ago | 2.27235c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |

| | FINISHED STEEL HIGH | FINISHED STEEL LOW | PIG IRON HIGH | PIG IRON LOW | SCRAP STEEL HIGH | SCRAP STEEL LOW |
|---|---|---|---|---|---|---|
| 1945 | 2.25839c., Jan. 16 | 2.21189c., Jan. 2 | $24.61, Feb. 20 | $23.61, Jan. 2 | $19.17 | $19.17 |
| 1944 | 2.30837c., Sept. 5 | 2.21189c., Oct. 5 | $23.61 | $23.61 | 19.17 | $15.67, Oct. 24 |
| 1943 | 2.25513c. | 2.25513c. | 23.61 | 23.61 | 19.17 | 19.17 |
| 1942 | 2.26190c. | 2.26190c. | 23.61 | 23.61 | 19.17 | 19.17 |
| 1941 | 2.43078c. | 2.43078c. | $23.61, Mar. 20 | $23.45, Jan. 2 | $22.00, Jan. 7 | $19.17, Apr. 10 |
| 1940 | 2.30467c., Jan. 2 | 2.24107c., Apr. 16 | 23.45, Dec. 23 | 22.61, Jan. 2 | 21.83, Dec. 30 | 16.04, Apr. 9 |
| 1939 | 2.35367c., Jan. 3 | 2.26689c., May 16 | 22.61, Sept. 19 | 20.61, Sept. 12 | 22.50, Oct. 3 | 14.08, May 16 |
| 1938 | 2.58414c., Jan. 4 | 2.27207c., Oct. 18 | 23.25, June 21 | 19.61, July 6 | 15.00, Nov. 22 | 11.00, June 7 |
| 1937 | 2.58414c., Mar. 9 | 2.32263c., Jan. 4 | 23.25, Mar. 9 | 20.25, Feb. 16 | 21.92, Mar. 30 | 12.67, June 8 |
| 1936 | 2.32263c., Dec. 28 | 2.05200c., Mar. 10 | 19.74, Nov. 24 | 18.73, Aug. 11 | 17.75, Dec. 21 | 12.67, June 9 |
| 1935 | 2.07642c., Oct. 1 | 2.06492c., Jan. 8 | 18.84, Nov. 5 | 17.83, May 14 | 13.42, Dec. 10 | 10.33, Apr. 29 |
| 1934 | 2.15367c., Apr. 24 | 1.95757c., Jan. 2 | 17.90, May 1 | 16.90, Jan. 27 | 13.00, Mar. 13 | 9.50, Sept. 25 |
| 1933 | 1.95578c., Oct. 3 | 1.75836c., May 2 | 16.90, Dec. 5 | 13.56, Jan. 3 | 12.25, Aug. 8 | 6.75, Jan. 3 |
| 1932 | 1.89196c., July 5 | 1.83901c. Mar. 1 | 14.81, Jan. 5 | 13.56, Dec. 6 | 8.50, Jan. 12 | 6.43, July 5 |
| 1931 | 1.99626c., Jan. 13 | 1.86586c., Dec. 29 | 15.90, Jan. 6 | 14.79, Dec. 15 | 11.33, Jan. 6 | 8.50, Dec. 29 |
| 1930 | 2.25488c., Jan. 7 | 1.97319c., Dec. 9 | 18.21, Jan. 7 | 15.90, Dec. 16 | 15.00, Feb. 18 | 11.25, Dec. 9 |
| 1929 | 2.31773c., May 28 | 2.26498c., Oct. 29 | 18.71, May 14 | 18.21, Dec. 17 | 17.58, Jan. 29 | 14.08, Dec. 3 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# *All we ask, is that you keep in mind*

**POLLAK MANUFACTURING COMPANY**

**Arlington, New Jersey**

**DEVELOPING • DESIGNING • MACHINE WORK • SPINNING**

**GAS AND RESISTANCE WELDING • STAMPING • ELECTRICAL WORK**

# Prices of Finished Iron and Steel . . .

**Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in.. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire. (15) Deduct 10c. per 100 lb. for plates not produced to sheared mill or universal mill width and length tolerances.**

| Basing Point / Product | Pittsburgh | Chicago | Gary | Cleveland | Birmingham | Buffalo | Youngstown | Sparrows Point | Granite City | Middletown, Ohio | Gulf Ports, Cars | 10 Pacific Ports, Cars | DELIVERED TO Detroit | New York | Philadelphia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SHEETS** | | | | | | | | | | | | | | | |
| Hot rolled | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.30¢ | 2.20¢ | | 2.75¢ | 2.30¢ | 2.44¢ | 2.37¢ |
| Cold rolled [1] | 3.05¢ | 3.05¢ | 3.05¢ | 3.05¢ | | 3.05¢ | 3.05¢ | | 3.15¢ | 3.05¢ | | 3.70¢ | 3.15¢ | 3.39¢ | 3.37¢ |
| Galvanized (24 gage) | 3.65¢ | 3.65¢ | 3.65¢ | | 3.65¢ | 3.65¢ | 3.65¢ | 3.65¢ | 3.75¢ | 3.65¢ | | 4.20¢ | | 3.89¢ | 3.82¢ |
| Enameling (20 gage) | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | | 3.35¢ | | 3.45¢ | 3.35¢ | | 4.00¢ | 3.45¢ | 3.71¢ | 3.67¢ |
| Long ternes [2] | 3.80¢ | 3.80¢ | 3.80¢ | | | | | | | | | 4.55¢ | | 4.16¢ | 4.12¢ |
| **STRIP** | | | | | | | | | | | | | | | |
| Hot rolled [3] | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | | | 2.10¢ | | 2.75¢ | 2.20¢ | 2.46¢ | |
| Cold rolled [4] | 2.80¢ | 2.90¢ | | 2.80¢ | | | 2.80¢ | (Worcester=3.00¢) | | | | | 2.90¢ | 3.16¢ | |
| Cooperage stock | 2.20¢ | 2.20¢ | | | 2.20¢ | | 2.20¢ | | | | | | | 2.56¢ | |
| Commodity C-R | 2.95¢ | 3.05¢ | | 2.95¢ | | | 2.95¢ | (Worcester=3.35¢) | | | | | 3.05¢ | 3.31¢ | |
| **TIN PLATE** | | | | | | | | | | | | | | | |
| Standard cokes, base box | $5.00 | $5.00 | $5.00 | | | | | | $5.10 | | | | | 5.36¢ | 5.32¢ |
| Electro, box 0.25 lb. | $4.35 | $4.35 | $4.35 | | | | | | $4.60 | | | | | | |
| Electro, box 0.50 lb. | $4.50 | $4.50 | $4.50 | | | | | | $4.75 | | | | | | |
| Electro, box 0.75 lb. | $4.65 | | $4.65 | | | | | | | | | | | | |
| **BLACK PLATE** | | | | | | | | | | | | | | | |
| 29 gage [5] | 3.05¢ | 3.05¢ | 3.05¢ | | | | | | 3.15¢ | | | 4.05¢[12] | | | 3.37¢ |
| **TERNES, MFG.** | | | | | | | | | | | | | | | |
| Special coated, base box | $4.30 | $4.30 | $4.30 | | | | | | $4.40 | | | | | | |
| **BARS** | | | | | | | | | | | | | | | |
| Carbon steel | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | (Duluth=2.25¢) | | | 2.50¢ | 2.80¢ | 2.25¢ | 2.49¢ | 2.47¢ |
| Rail steel [6] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | | 2.50¢ | 2.80¢ | | | |
| Reinforcing (billet) [7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | 2.50¢ | 2.55¢[13] | 2.25¢ | 2.39¢ | |
| Reinforcing (rail) [7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | 2.50¢ | 2.55¢[13] | 2.25¢ | | 2.47¢ |
| Cold finished [8] | 2.65¢ | 2.65¢ | 2.65¢ | 2.65¢ | | 2.65¢ | | (Detroit=2.70¢) | | | (Toledo=2.80¢) | | | 2.99¢ | 2.97¢ |
| Alloy, hot rolled | 2.70¢ | 2.70¢ | | | | 2.70¢ | | (Bethlehem, Massillon, Canton=2.70¢) | | | | | 2.80¢ | | |
| Alloy, cold drawn | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | 3.35¢ | | | | | | | 3.45¢ | | |
| **PLATES** | | | | | | | | (Coatesville and Claymont=2.20¢) | | | | | | | |
| Carbon steel [15] | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | | 2.20¢ | 2.20¢ | 2.45¢ | | 2.55¢ | 2.75¢ | 2.42¢ | 2.39¢ | 2.25¢ |
| Floor plates | 3.35¢ | 3.35¢ | | | | | | | | | 3.70¢ | 4.00¢ | | 3.71¢ | 3.67¢ |
| Alloy | 3.50¢ | 3.50¢ | | | (Coatesville=3.50¢) | | | | | | 3.95¢ | 4.15¢ | | 3.70¢ | 3.59¢ |
| **SHAPES** | | | | | | | | | | | | | | | |
| Structural | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | | (Bethlehem=2.10¢) | | | 2.45¢ | 2.75¢ | | 2.27¢ | 2.215¢ |
| **SPRING STEEL, C-R** | | | | | | | | | | | | | | | |
| 0.26 to 0.50 Carbon | 2.80¢ | | | 2.80¢ | | | (Worcester=3.00¢) | | | | | | | | |
| 0.51 to 0.75 Carbon | 4.30¢ | | | 4.30¢ | | | (Worcester=4.50¢) | | | | | | | | |
| 0.76 to 1.00 Carbon | 6.15¢ | | | 6.15¢ | | | (Worcester=6.35¢) | | | | | | | | |
| 1.01 to 1.25 Carbon | 8.35¢ | | | 8.35¢ | | | (Worcester=8.55¢) | | | | | | | | |
| **WIRE [9]** | | | | | | | | | | | | | | | |
| Bright [14] | 2.60¢ | 2.60¢ | | 2.60¢ | 2.60¢ | | (Worcester=2.70¢) | | | (Duluth=2.65¢) | | 3.10¢ | | | 2.92¢ |
| Galvanized | Add proper size extra and galvanizing extra to Bright Wire base | | | | | | | | | | | | | | |
| Spring (High Carbon) | 3.20¢ | 3.20¢ | | 3.20¢ | | | (Worcester=3.30¢) | | | | | 3.70¢ | | | 3.52¢ |
| **PILING** | | | | | | | | | | | | | | | |
| Steel Sheet | 2.40¢ | 2.40¢ | | | | 2.40¢ | | | | | | 2.95¢ | | | 2.72¢ |

**EXCEPTIONS TO PRICE SCHED. NO. 6.**

**Slabs, per gross ton**—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50; Kaiser Co. rerolling $58.64, (forging) $64.64, f.o.b. Los Angeles.

**Blooms, per gross ton**—Phoenix Iron Co. (rerolling) $41; (forging) $47; Pgh. Steel Co. (rerolling) $38.25, (forging) $44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) $58.64, (forging) $64.64, (shell steel) $74.64 f.o.b. Los Angeles.

**Sheet Bar, per gross ton**—Empire Sheet & Tin Plate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

**Billets, Forging, per gross ton**—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto, Ohio; Phoenix Iron Co. $47 mill; Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50; Kaiser Co. $64.64, (shell steel) $74.64, f.o.b. Los Angeles.

**Billets, Rerolling, per gross ton**—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continen-

## PRICES

Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) 60 Kokomo, Ind. (these prices include $1 extra); Keystone Steel & Wire Co. 40 Peoria; Connors Steel Co. $50.60 Birmingham; Ford Motor Co. $34 Dearborn, ch.; Geneva Steel Co. $58.64 f.o.b. Pacific rt; Pgh. Steel Co. $43.50; Kaiser Co. 64 f.o.b. Los Angeles.

ctural Shapes—Phoenix Iron Co. 2.35c. ing pts. (export) 2.50c. Phoenixville; xville Iron Co. 2.30c. basing points; er Co. 3.20c. f.o.b. Los Angeles.

s, per gross ton—Sweet Steel Co. (rail l) $50 mill; West Virginia Rail Co. (lightht) on allocation based Huntington, Va.; Colorado Fuel & Iron Corp., $45 hio.

Rolled Plate—Granite City Steel Co. c. mill; Knoxville Iron Co. 2.25c. basing ; Kaiser Co. and Geneva Steel Co. 3.20c. ific Ports; Central Iron and Steel Co. c. basing points; Granite City Steel Co. c. Granite City.

chant Bars—W. Ames Co., 10 tons and , 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. ing pts. (rail steel) 2.40c.; Phoenix Iron 2.40c. basing pts.; Sweet Steel Co. (rail l) 2.33c. mill; Joslyn Mfg. & Supply Co., c. Chicago; Calumet Steel Div., Borg rner Corp. (8 in. mill bar), 2.35c. Chicago; xville Iron Co., 2.30c. basing pts.; Lac Steel Co., sales to LaSalle Steel granted cago base, f.o.b. Madison, Ill.; Milton . Co., 2.75c. f.o.b. Milton, Pa.

Skelp—Wheeling Steel Corp., Benwood, c.

nforcing Bars—W. Ames & Co., 10 tons over, 2.85c. mill; Sweet Steel Co. (rail l), 2.33c mill; Columbia Steel Co., 2.50c. ific Ports.

Finished Bars—Keystone Drawn Steel on allocation, Pittsburgh c.f. base plus freight on hot rolled bars Pittsburgh to ing City, Pa.; New England Drawn Steel on allocation outside New England, Buf- c.f. base plus c/l freight Buffalo to nsfield, Mass., f.o.b. Mansfield; Empire ished Steel Corp. on allocation outside w England, Buffalo c.f. base plus c/l ight Buffalo to plants, f.o.b. plant; Comssed Steel Shafting Co. on allocation out- New England, Buffalo base plus c/l ight Buffalo to Readville, Mass. f.o.b. dville; Medart Co. in certain areas, Chi- c.f. base plus c/l freight Chicago to St. is, f.o.b. St. Louis.

oy Bars—Texas Steel Co., for delivery ext Texas and Okla., Chicago base, f.o.b. rt Worth, Tex.; Connors Steel Co., shipped side Ala., Mississippi, Louisiana, Georgia, rida, Tenn., Pittsburgh base, f.o.b. Birmingham.

t Rolled Strip—Joslyn Mfg. & Supply Co., c. Chicago; Knoxville Iron Co., 2.25c. basg pts.

t Rolled Sheets—Andrews Steel Co., Middlen base on shipments to Detroit or area; rkersburg Iron & Steel Co., 2.25c. Parkersrg.

lvanized Sheets—Andrews Steel Co. 3.75c. ing pts.; Parkersburg Iron & Steel Co., 5c. Parkersburg; Apollo Steel Co., 3.75c. ing pts.; Continental Steel Co., Middlen base on Kokomo, Ind., product; Superior eet Steel Co., Pittsburgh base except for nd-Lease.

pe and Tubing—South Chester Tube Co. en priced at Pittsburgh, freight to Gulf ast and Pacific Ports may be charged from ester, Pa., also to points lying west of rrisburg, Pa.

ack Sheets—Empire Sheet and Tinplate Co., aximum base price mill is 2.45c. per 100 lb., th differentials, transportation charges, etc., ovided in RPS. No. 6.

ire Products—Pittsburgh Steel Co., f.o.b. ttsburgh, per 100 lb., rods, No. 5 to 9/32 , 2.20c.; rods, heavier than 9/32, 2.35c.; ight wire, 2.725c.; bright nails, 2.90c.; lead d furnace annealed wire, 2.85c.; pot analed wire, 2.85c.; galvanized barbed wire, 0c.; plain staples, 2.55c.; galvanized staples, 5c.; bright spring wire, 3.30c.; galvanized ring wire, 3.45c.

Bulletin 32-33-B-12 covers such vital subjects as the advantages of Positive Displacement principle, capacity and efficiency curves, features of design and construction, various applications and drives, dimension and capacity tables on standard units for moderate pressures. Your copy is ready for you. Also ask for Bulletin 31-B-15 covering complete line of smaller units for many applications.

**ROOTS - CONNERSVILLE BLOWER CORPORATION**

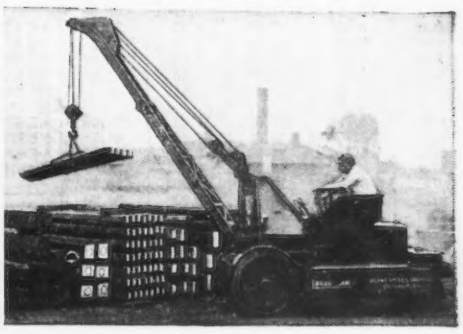
*One of the Dresser Industries*

**503 Ohio Ave., Connersville, Ind.**

Roots CONNERSVILLE SINCE 1854

Rotary Positive GAS BOOSTERS

## HOW TO HANDLE STEEL *Faster*



Move a KRANE KAR up to a pile of forgings, bars, blooms, billets, ingots, castings (or a scrap heap when equipped with an electric magnet), and top the boom with the full load. Transport load forward or backward and position it on either side in places inaccessible to a rigid boom crane. Make speed with the all-around safety features—stability without jacks or outriggers, automatic braking of load and boom, easy steering, and utter simplicity of operation. Write for catalog No. 58.

USERS: Carnegie-Illinois; Bethlehem; Republic; General Motors; Consolidated; American Smelting & Refining; Lima Locomotive Wks.; etc.

*THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER*

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

SILENT HOIST & CRANE CO., 851 63RD ST., BROOKLYN 20, N.Y.

## WAREHOUSE PRICES

*Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.*

| Cities | SHEETS | | | STRIP | | Plates ¼ in. and heavier | Structural Shapes | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot Rolled (10 gage) | Cold Rolled | Galvanized (24 gage) | Hot Rolled | Cold Rolled | | | Hot Rolled | Cold Finished | Hot Rolled, NE 8617-20 | Hot Rolled, NE 9442-45 Ann. | Cold Drawn, NE 8617-20 | Cold Drawn, NE 9442-40 Ann. |
| **Philadelphia | $3.618 | $4.872[8] | $5.168a | $3.922 | $4.772 | $3.705 | $3.666 | $3.822 | $4.072 | $5.968 | $7.066 | $7.272 | $8.322 |
| New York | 3.690 | 4.613[3] | 5.160 | 3.974[6] | 4.772 | 3.868 | 3.758 | 3.853 | 4.103 | 6.008 | 7.108 | 7.303 | 8.353 |
| Boston | 3.844 | 4.744[9] | 5.374[9] | 4.106 | 4.715 | 4.012 | 3.912 | 4.044 | 4.144 | 6.162 | 7.262 | 7.344 | 8.394 |
| Baltimore | 3.494 | 4.852 | 5.044 | 3.902 | 4.752 | 3.694 | 3.759 | 3.802 | 4.052 | .... | .... | .... | .... |
| Norfolk | 3.871 | 4.965 | 5.521 | 4.165 | 4.865 | 4.071 | 4.002 | 4.065 | 4.165 | .... | .... | .... | .... |
| Chicago | 3.35 | 4.20 | 5.381 | 3.60 | 4.65[17] | 3.65 | 3.55 | 3.50 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| Milwaukee | 3.487 | 4.337[3] | 5.422[4] | 3.737 | 4.787[17] | 3.787 | 3.687 | 3.637 | 3.887 | 5.987 | 7.087 | 7.087 | 8.137 |
| Cleveland | 3.45 | 4.40 | 5.027[4] | 3.60 | 4.45 | 3.50 | 3.588 | 3.35 | 3.75 | 5.956 | 7.056 | 6.85 | 7.90 |
| Buffalo | 3.45 | 4.40 | 4.90[4] | 3.819 | 4.669 | 3.73 | 3.40 | 3.35 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| Detroit | 3.55 | 4.50 | 5.15[4] | 3.70 | 4.65[917] | 3.709 | 3.681 | 3.45 | 3.80 | 6.08 | 7.18 | 7.159 | 8.209 |
| Cincinnati | 3.525 | 4.475[2] | 4.975[5] | 3.675 | 4.711 | 3.711 | 3.691 | 3.611 | 4.011 | .... | .... | .... | .... |
| St. Louis | 3.497 | 4.347[2] | 5.322[4] | 3.747 | 4.931[17] | 3.797 | 3.697 | 3.647 | 4.031 | 6.131 | 7.231 | 7.231 | 8.281 |
| Pittsburgh | 3.45 | 4.40 | 4.90 | 3.60 | 4.45 | 3.50 | 3.40 | 3.35 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| St. Paul | 3.61 | 4.48 | 5.407[4] | 3.86 | 4.35[17] | 3.91[13] | 3.81[13] | 3.76[13] | 4.361 | 6.09 | 7.19 | 7.561 | 8.711 |
| Omaha | 3.965 | 5.443 | 5.758[4] | 4.215 | .... | 4.265 | 4.165 | 4.115 | 4.43 | .... | .... | .... | .... |
| Indianapolis | 3.68 | 3.58 | 4.718 | 4.918 | 3.768 | 4.88 | 3.63 | 3.58 | 3.98 | 6.08 | 7.18 | 7.18 | 8.23 |
| Birmingham | 3.55 | .... | 4.90 | 3.70 | .... | 3.65 | 3.55 | 3.50 | 4.43 | .... | .... | .... | .... |
| Memphis | 4.065[7] | 4.66 | 3.415 | 4.215 | .... | 4.165 | 4.065 | 4.015 | 4.33 | .... | .... | .... | .... |
| New Orleans | 4.158* | 4.95 | 5.508 | 4.308 | .... | 4.258 | 4.158* | 4.108* | 4.629 | .... | .... | .... | .... |
| Houston | 3.863 | 5.573 | 6.463[1] | 4.313 | .... | 4.35 | 4.25 | 3.75 | 6.373[2] | 7.223 | 8.323 | 8.323 | 9.373 |
| Los Angeles | 5.10 | 7.20[3] | 6.25[4] | 4.95 | 5.613[15] | 5.05 | 4.65 | 4.40 | 5.583 | 8.304 | 9.404 | 9.404 | 10.454 |
| San Francisco | 4.65[14] | 7.30[4] | 6.50[4] | 4.50[14] | 7.333[17] | 4.75[14] | 4.35[14] | 4.15[14] | 5.333 | 8.304 | 9.404 | 9.404 | 10.454 |
| Seattle | 4.75[12] | 7.05[4] | 6.10[4] | 4.25[12] | .... | 4.85[12] | 4.45[12] | 4.35[12] | 5.783 | .... | 9.404 | .... | .... |
| Portland | 4.75[11] | 6.60[4] | 5.90[4] | 4.75[11] | .... | 4.85[11] | 4.45[11] | 4.45[11] | 5.533 | 8.304 | 9.404 | 8.304 | 9.404 |
| Salt Lake City | 4.63[17] | .... | 6.32[18] | 5.53[17] | .... | 5.08[17] | 4.98[17] | 4.88[17] | 5.90 | .... | .... | .... | .... |

## National Emergency Steels

### MILL EXTRAS

| Designation | Basic Open-Hearth | | Electric Furnace | | Designation | Basic Open-Hearth | | Electric Furnace | |
|---|---|---|---|---|---|---|---|---|---|
| | Bars and Bar-Strip | Billets, Blooms, and Slabs | Bars and Bar-Strip | Billets, Blooms, and Slabs | | Bars and Bar-Strip | Billets, Blooms, and Slabs | Bars and Bar-Strip | Billets, Blooms, and Slabs |
| NE 8612 | 0.65¢ | $13.00 | $1.15 | $23.00 | NE 9427 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8615 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9430 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8617 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9432 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8620 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9435 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8622 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9437 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8625 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9440 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8627 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9442 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8630 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9445 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8632 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9447 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8635 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9450 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8637 | 0.65 | 13.00 | 1.15 | 23.00 | | | | | |
| NE 8640 | 0.65 | 13.00 | 1.15 | 23.00 | | | | | |
| NE 8642 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9722 | 0.65¢ | $13.00 | $1.15 | $23.00 |
| NE 8645 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9727 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8647 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9732 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8650 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9737 | 0.65 | 13.00 | 1.15 | 23.00 |
| | | | | | NE 9742 | 0.65 | 13.00 | 1.15 | 23.00 |
| | | | | | NE 9745 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8712 | 0.70¢ | $14.00 | $1.20 | $24.00 | NE 9747 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8715 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9750 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8717 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9763 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8720 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9768 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8722 | 0.70 | 14.00 | 1.20 | 24.00 | | | | | |
| NE 8725 | 0.70 | 14.00 | 1.20 | 24.00 | | | | | |
| NE 8727 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9830 | $1.30 | $26.00 | $1.80 | $36.00 |
| NE 8730 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9832 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8732 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9935 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8735 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9837 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8737 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9840 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8740 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9842 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8742 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9845 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8745 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9847 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8747 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9850 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8750 | 0.70 | 14.00 | 1.20 | 24.00 | | | | | |
| | | | | | NE 9912 | $1.20 | $24.00 | $1.55 | $31.00 |
| NE 9415 | 0.75¢ | $15.00 | $1.25 | $25.00 | NE 9915 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9417 | 0.75 | 15.00 | 1.25 | 25.00 | NE 9917 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9420 | 0.75 | 15.00 | 1.25 | 25.00 | NE 9920 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9422 | 0.75 | 15.00 | 1.25 | 25.00 | NE 9922 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9425 | 0.75 | 15.00 | 1.25 | 25.00 | NE 9925 | 1.20 | 24.00 | 1.55 | 31.00 |

**Note 1:** The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. **Note 2:** For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. **Note 3:** When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. **Note 4:** The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

## BASE QUANTITIES

*Standard unless otherwise keyed on prices.*

**HOT ROLLED:** Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

**COLD ROLLED:** Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

**EXCEPTIONS:** (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

| | *Per Gross Ton* |
|---|---|
| Old range, bessemer, 51.50 | $4.75 |
| Old range, non-bessemer, 51.50 | 4.60 |
| Mesaba, bessemer, 51.50 | 4.60 |
| Mesaba, non-bessemer, 51.50 | 4.45 |
| High phosphorus, 51.50 | 4.35 |

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

## FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

### *Exception*

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

| Effective $CaF_2$ Content: | *Base price per short ton* |
|---|---|
| 70% or more | $33.00 |
| 65% but less than 70% | 32.00 |
| 60% but less than 65% | 31.00 |
| Less than 60% | 30.00 |

## PRICES

### SEMI-FINISHED STEEL

***Ingots, Carbon, Rerolling***

Base per gross ton, f.o.b. mill.... $31.00
*Exceptions:* Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., $34.25; Pgh. Steel Co., $33.10.

***Ingots, Carbon, Forging***

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown ..... $36.00
*Exceptions:* Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., $38.10.

***Ingots, Alloy***

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh ..... $45.00
*Exceptions:* C/L delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

***Billets, Blooms and Slabs***

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only): Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Provo, $11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

| | *Per Gross Ton* |
|---|---|
| Rerolling | $34.00 |
| Forging quality | 40.00 |

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

***Alloy Billets, Blooms, Slabs***

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton ..... $54.00
Price delivered Detroit $2.00 higher; East Michigan, $3.00 higher.

***Shell Steel***

| | *Per Gross Ton* |
|---|---|
| 3 in. to 12 in. | $52.00 |
| 12 in. to 18 in. | 54.00 |
| 18 in. and over | 56.00 |

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.
Price Exception: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.
Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

***Sheet Bars***

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

| | *Per Gross Ton* |
|---|---|
| Open hearth or bessemer | $34.00 |

***Skelp***

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

| | *Per Lb.* |
|---|---|
| Grooved, universal and sheared | 1.90c. |

***Wire Rods***

*(No. 5 to 9/32 in.)*

| | *Per Lb.* |
|---|---|
| Pittsburgh, Chicago, Cleveland | 2.00c. |
| Worcester, Mass. | 2.10c. |
| Birmingham | 2.00c. |
| San Francisco | 2.50c. |
| Galveston | 2.25c. |

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

### TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse)*

| | *Base per lb.* |
|---|---|
| High speed | 67c. |
| Straight molybdenum | 54c. |
| Tungsten-molybdenum | 57½c. |
| High-carbon-chromium | 43c. |
| Oil hardening | 24c. |
| Special carbon | 22c. |
| Extra carbon | 18c. |
| Regular carbon | 14c. |

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.


PERFORATED METALS

ORNAMENTAL

Any Metal
Any Perforation

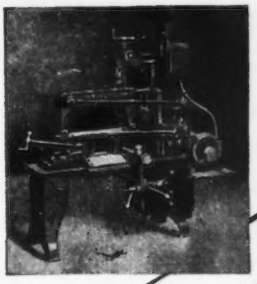
For INDUSTRIAL purposes a great variety of sizes and shapes of perforations are required, ranging from very fine to as large as 6" or more in diameter. We are equipped to supply all standard perforations in all kinds and thicknesses of metals.

ORNAMENTAL patterns are covered by our grille catalog. If interested, we hope you will send for it. There are attractive patterns for different uses.

INDUSTRIAL

The Harrington & King PERFORATING Co.

5667 FILLMORE ST., CHICAGO 44 • EASTERN OFFICE: 114 LIBERTY ST., NEW YORK 6, N. Y.



Best!
FOR LIGHT DUTY
Speed!

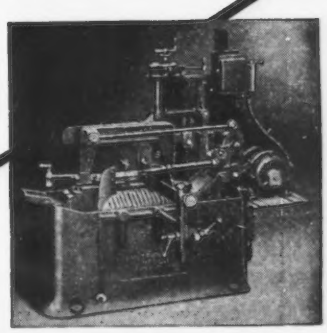
High Speed at Low Cost
No. 4B

For tool room, stock room, or maintenance shop, this 6" x 6" capacity hack saw is superior to anything in its price class. Embodies similar design principles and features of MARVEL Heavy Duty production saws. Cuts a 2" standard pipe in 30 seconds—a 5" round piece of machine steel in 8 minutes!

MARVEL SAWS

2-Speed and 4-Speed

For applications where materials of different hardnesses and alloy characteristics are to be cut, MARVEL 4B is available in 2-Speed and 4-Speed models. Built-in work tracks for holding outer end of bars are also available for all models.

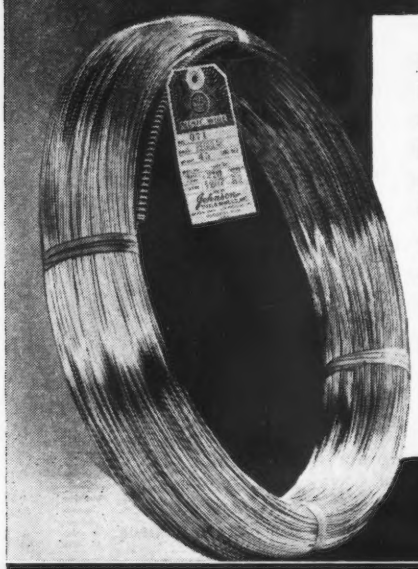


Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course.)

ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

# JOHNSON *wire*



Quality wire under constant laboratory control all the way from raw material to finished product . . . to meet precisely the most exacting specifications of industry.

XLO Aircraft Cable Wire, extra high fatigue wire, carefully drawn to size and finish.

XLO Music wire (WD-1085–WD-1095) – the wire of a thousand uses. Wire sizes .003″ to .200″ diameter.

**JOHNSON STEEL & WIRE CO., INC.**
WORCESTER 1, MASSACHUSETTS.
NEW YORK AKRON CHICAGO LOS ANGELES



# BELLEVUE
## *Controlled Atmosphere*
# FURNACES

EVERY Bellevue furnace is designed and built for a specific job. Hundreds of furnaces and repeat orders in scores of plants is evidence enough that you can have complete confidence in Bellevue engineers to solve your heat treating problems. Send for complete details.

**BELLEVUE INDUSTRIAL FURNACE CO.**
2974 BELLEVUE AVENUE DETROIT, MICH.


## PRICES

### WELDED PIPE AND TUBING

*Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills*
*(F.o.b. Pittsburgh only on wrought pipe)*
*Base Price—$200.00 per Net Ton*

| | Black | Galv. |
|---|---|---|
| ***Steel (Butt Weld)*** | | |
| ½ in. | 63½ | 51 |
| ¾ in. | 66½ | 55 |
| 1 to 3 in. | 68½ | 57½ |
| ***Wrought Iron (Butt Weld)*** | | |
| ½ in. | 24 | 3½ |
| ¾ in. | 30 | 10 |
| 1 and 1¼ in. | 34 | 16 |
| 1½ in. | 38 | 18½ |
| 2 in. | 37½ | 18 |
| ***Steel (Lap Weld)*** | | |
| 2 in. | 61 | 49½ |
| 2½ in. and 3 in. | 64 | 52½ |
| 3½ to 6 in. | 66 | 54½ |
| ***Wrought Iron (Lap Weld)*** | | |
| 2 in. | 30½ | 12 |
| 2½ to 3½ in. | 31½ | 14½ |
| 4 in. | 33½ | 18 |
| 4½ to 8 in. | 32½ | 17 |
| ***Steel (Butt, extra strong, plain ends)*** | | |
| ½ in. | 61½ | 50½ |
| ¾ in. | 65½ | 54½ |
| 1 to 3 in. | 67 | 57 |
| ***Wrought Iron (Same as Above)*** | | |
| ½ in. | 25 | 6 |
| ¾ in. | 31 | 12 |
| 1 to 2 in. | 38 | 19½ |
| ***Steel (Lap, extra strong, plain ends)*** | | |
| 2 in. | 59 | 48½ |
| 2½ and 3 in. | 63 | 52½ |
| 3½ to 6 in. | 66½ | 56 |
| ***Wrought Iron (Same as Above)*** | | |
| 2 in. | 33½ | 15½ |
| 2½ to 4 in. | 39 | 22½ |
| 4½ to 6 in. | 37½ | 21 |

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

### CAST IRON WATER PIPE

| | *Per Net Ton* |
|---|---|
| 6-in. and larger, del'd Chicago | $54.80 |
| 6-in. and larger, del'd New York | 52.20 |
| 6 in. and larger, Birmingham | 46.00 |
| 6-in. and larger f.o.b. cars, San Francisco or Los Angeles | 69.40 |
| 6-in. and larger f.o.b. cars, Seattle | 71.20 |

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

### BOILER TUBES

*Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pitsburgh, in carload lots.*

| | *Seamless Cold Drawn* | *Seamless Hot Rolled* | *Lap Weld, Hot Rolled* |
|---|---|---|---|
| 2 in. o.d. 13 B.W.G. | 15.03 | 13.04 | 12.38 |
| 2½ in. o.d. 12 B.W.G. | 20.21 | 17.54 | 16.53 |
| 3 in. o.d. 12 B.W.G. | 22.48 | 19.50 | 18.35 |
| 3½ in. o.d. 11 B.W.G. | 28.37 | 24.62 | 23.15 |
| 4 in. o.d. 10 B.W.G. | 35.20 | 30.54 | 28.66 |

*(Extras for less carload quantities)*

| | |
|---|---|
| 40,000 lb. or ft. and over | Base |
| 30,000 lb. or ft. to 39,999 lb. or ft. | 5% |
| 20,000 lb. or ft. to 29,999 lb. or ft. | 10% |
| 10,000 lb. or ft. to 19,999 lb. or ft. | 20% |
| 5,000 lb. or ft. to 9,999 lb. or ft. | 30% |
| 2,000 lb. or ft. to 4,999 lb. or ft. | 45% |
| Under 2,000 lb. or ft. | 65% |

## PRICES

### WIRE PRODUCTS

*To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth*

| | Basing Points Named | Pacific Coast Basing Points† |
|---|---|---|
| | *Base per Keg* | |
| Standard wire nails | $2.80 | $3.30 |
| Coated nails | 2.80 | 3.30 |
| Cut nails, carloads | 2.85 | .... |
| | *Base per 100 lb.* | |
| Annealed fence wire | $3.05 | $3.55 |
| Annealed galv. fence wire | 3.40 | 3.90 |
| | *Base Column* | |
| Woven wire fence* | .67 | .85 |
| Fence posts, carloads | .69 | .86 |
| Single loop bale ties | .59 | .84 |
| Galvanized barbed wire** | .70 | .80 |
| Twisted barbless wire | .70 | .... |

*15½ gage and heavier. **On 80-rod spools in carload quantities.
†Prices subject to switching or transportation charges.

### BOLTS, NUTS, RIVETS, SET SCREWS

***Bolts and Nuts***

*(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)*

**Machine and Carriage Bolts:**
*Base discount less case lots*

| | Per Cent Off List |
|---|---|
| ½ in. & smaller x 6 in. & shorter | 65½ |
| 3/16 & ⅝ in. x 6 in. & shorter | 63½ |
| ¾ to 1 in. x 6 in. shorter | 61 |
| 1⅛ in. and larger, all lengths | 59 |
| All diameters over 6 in. long | 59 |
| Lag, all sizes | 62 |
| Plow bolts | 65 |

**Nuts, Cold Punched or Hot Pressed:**
*(Hexagon or Square)*

| | |
|---|---|
| ½ in. and smaller | 62 |
| 9/16 to 1 in. inclusive | 59 |
| 1⅛ to 1¼ in. inclusive | 57 |
| 1⅜ in. and larger | 56 |

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

| Semi-Fin. Hexagon Nuts | U.S.S. | S.A.E. |
|---|---|---|
| *Base discount less keg lots* | | |
| 7/16 in. and smaller | .. | 64 |
| ½ in. and smaller | 62 | .. |
| ½ in. through 1 in. | .. | 60 |
| 9/16 in. through 1 in. | 59 | .. |
| 1⅛ in. through 1½ in. | 57 | 58 |
| 1⅝ in. and larger | 56 | .. |

In full keg lots, 10 per cent additional discount.

***Stove Bolts*** — *Consumer*

| | |
|---|---|
| Packages, nuts loose | 71 and 10 |
| In packages, with nuts attached | 71 |
| In bulk | 80 |

On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

***Large Rivets***
*(½ in. and larger)*

*Base per 100 Lb.*

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... $3.75

***Small Rivets***
*(7/16 in. and smaller)*

*Per Cent Off List*

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

| ***Cap and Set Screws*** | *Consumer Per Cent Off List* |
|---|---|
| Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. | 64 |
| Upset set screws, cup and oval points | 71 |
| Milled studs | 46 |
| Flat head cap screws, listed sizes | 36 |
| Fillister head cap, listed sizes | 51 |

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

### ROOFING TERNE PLATE

*(F.o.b. Pittsburgh, 112 Sheets)*

| | 20x14 in. | 20x28 in. |
|---|---|---|
| 8-lb. coating I.C. | $6.00 | $12.00 |
| 15-lb. coating I.C. | 7.00 | 14.00 |
| 30-lb. coating I.C. | 7.50 | 15.00 |

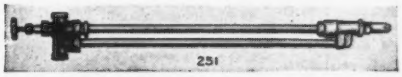

FOR ALL TYPES of INDUSTRIAL FURNACES

NO CLOGGING NO CLEANING

of this TYPE SA

Steam Atomizing Oil Burner

The Type SA is an economical and trouble free burner that has a wide range of application. It can be used where steam or compressed air is available for atomization; steam consumption is very low. The burner requires very little maintenance and can be operated continuously without clogging and without interruptions for cleaning. Oil pressure and temperature required are low. Efficiently burns cheapest grades of oil and tar.




Above is shown one typical Type SA Burner arrangement. The SA is available in 5 sizes with rated capacities from 10 to 200 g.p.h. For full details write for Bulletin 21.

NATIONAL AIROIL FUEL OIL - GAS BURNERS

Steam Atomizing Oil Burners—Mechanical Pressure Atomizing Oil Burners—Low Air Pressure Oil Burners—Motor-driven Rotary Oil Burners—Industrial Gas Burners—Combination Gas and Oil Burners—Fuel Oil Pumping Units—Fuel Oil Heaters—Fuel Oil Strainers and other accessories.

NATIONAL AIROIL BURNER COMPANY, INCORPORATED

1271 East Sedgley Ave., Philadelphia 34, Pa.

ESTABLISHED 1912 INCORPORATED 1917

Did you Know?

Over 50% of furnace wall radiation losses alone can be stopped? Therm-O-Flake Insulation is preferred for this work in most steel plants.

Here's why!

Highest insulating value — easy to apply — low maintenance — low cost — high reclamation — sticks tightly to silica or basic brick — permits closer control of fuel-air ratios — reduces cold air infiltration.

Write for literature

Illinois Clay Products Company
JOLIET, ILL.

Therm-O-flake
HIGH TEMPERATURE INSULATION
BRICK - BLOCK - COATINGS - CONCRETE - GRANULES

# PIG IRON

**All prices set in bold face type are maximums established by OPA as of February 14, 1945. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maximum. Delivered prices do not reflect 3 per cent tax on freight rates.**

| | No. 2 Foundry | Basic | Bessemer | Malleable | Low Phosphorus | Charcoal |
|---|---|---|---|---|---|---|
| Boston | *$26.50* | *$26.00* | *$27.50* | *$27.00* | ..... | ..... |
| Brooklyn | *28.50* | *28.00* | ..... | *29.00* | ..... | ..... |
| Jersey City | *27.53* | *27.03* | *28.53* | *28.03* | ..... | ..... |
| Philadelphia | *26.84* | *26.34* | *27.84* | *27.34* | *$31.74* | ..... |
| Bethlehem | $26.00 | $25.50 | $27.00 | $26.50 | ..... | ..... |
| Everett, Mass. | 26.00 | 25.50 | 27.00 | 26.50 | ..... | ..... |
| Swedeland, Pa. | 26.00 | 25.50 | 27.00 | 26.50 | ..... | ..... |
| Steelton, Pa. | ..... | 25.50 | ..... | ..... | $30.50 | ..... |
| Birdsboro, Pa. | 26.03 | 25.50 | 27.00 | 26.50 | 30.50 | ..... |
| Sparrows Point, Md. | 26.00 | 25.50 | ..... | ..... | ..... | ..... |
| Erie, Pa. | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Neville Island, Pa. | 25.00 | 24.50 | 25.50 | 25.00 | ..... | ..... |
| Sharpesville, Pa. (1) | 25.00 | 24.50 | 25.50 | 25.00 | ..... | ..... |
| Buffalo | 25.00 | 24.00 | 26.00 | 25.50 | 30.50 | ..... |
| Cincinnati, Ohio | *26.11* | *25.61* | ..... | *26.11* | ..... | ..... |
| Canton, Ohio | *26.39* | *25.89* | *26.89* | *26.39* | *33.69* | ..... |
| Mansfield, Ohio | *26.94* | *26.44* | *27.44* | *26.94* | *33.86* | ..... |
| St. Louis | *25.50* | *25.50* | ..... | ..... | ..... | ..... |
| Chicago | 25.00 | 24.50 | 25.50 | 25.00 | *36.46* | ..... *$37.34* |
| Granite City, Ill. | 25.00 | 24.50 | 25.50 | 25.00 | ..... | ..... |
| Cleveland | 25.00 | 24.50 | 25.50 | 25.00 | *33.42* | ..... |
| Hamilton, Ohio | 25.00 | 24.50 | ..... | 25.00 | ..... | ..... |
| Toledo | 25.00 | 24.50 | 25.50 | 25.00 | ..... | ..... |
| Youngstown | 25.00 | 24.50 | 25.50 | 25.00 | *33.42* | ..... |
| Detroit | 25.00 | 24.50 | 25.50 | 25.00 | ..... | ..... |
| Lake Superior, fc. | ..... | ..... | ..... | ..... | ..... | 34.00 |
| Lyles, Tenn., fc. (2) | ..... | ..... | ..... | ..... | ..... | 33.00 |
| St. Paul | *27.63* | 27.13 | *28.10* | *27.63* | *40.80* | ..... |
| Duluth | 25.50 | 25.00 | 26.00 | 25.50 | ..... | ..... |
| Birmingham | 21.38 | 20.00 | 26.00 | ..... | ..... | ..... |
| Los Angeles | *27.95* | .... | ..... | ..... | ..... | ..... |
| San Francisco | *27.95* | ..... | ..... | ..... | ..... | ..... |
| Seattle | *27.95* | ..... | ..... | ..... | ..... | ..... |
| Provo, Utah | 23.00 | 22.50 | ..... | ..... | ..... | ..... |
| Montreal | *28.50* | *28.50* | ..... | *29.00* | ..... | ..... |
| Toronto | *26.50* | *26.50* | ..... | *27.00* | ..... | ..... |

GRAY FORGE IRON: Valley or Pittsburgh furnace..... $24.50

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

(2) Price shown is for low-phosphorus iron; high phosphorus sells for $28.50 at the furnace.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

Logan
a name to remember when you think of
BETTER LATHES
The only lathe which combines all these
SIX FEATURES
1. Ball Bearing Headstock for sustained spindle accuracy, high speeds.
2. Back Gears, enclosed in headstock and back gear shifter rack at operator's finger tips.
3. Self Lubricating Bronze Bearings at vital points.
4. Bed design, two V-ways and two flat ways, precision ground, assures alignment of major parts.
5. Rubber cushioned countershaft and 3-point suspension assures smoothness.
6. All belts and gears enclosed. Raising of cone pulley guard automatically releases belt tension.
BRIEF SPECIFICATIONS
Common to all LOGAN LATHES
Swing over bed, 10½"
Bed width across ways, 6 15/16"
Bed length, 43⅛"
Size of hole through spindle, 25/32"
Spindle nose diameter and threads per inch, 1½"–8
12 Spindle Speeds, 30 to 1450 r.p.m.
Size of motor, ⅓ or ½ h.p., 1750 r.p.m.

These six features add up to precision performance, high speed production, long lathe life and more safety for the operator. They explain why the name Logan stands for BETTER Lathes in every field of industry. See your Logan dealer or write for catalog of Logan Lathes.

B-3

**LOGAN ENGINEERING CO.** • Chicago 30, Illinois


## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

| | |
|---|---|
| Copper, electrolytic, 150 and 200 mesh | 21½ to 23½c. |
| Copper, reduced, 150 and 200 mesh | 20½ to 25½c. |
| Iron, commercial, 100 and 200 mesh 96 + % Fe | 13½ to 15c. |
| Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots | 4c. |
| Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots | 63c. |
| Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe | 30 to 33c. |
| Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe | 42c. |
| Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe | 90c. |
| Aluminum, 100 and 200 mesh | *23 to 27c. |
| Antimony, 100 mesh | 20.6c. |
| Cadmium, 100 mesh | $1 |
| Chromium, 150 mesh | $1.03 |
| Lead, 100, 200 & 300 mesh | 11½ to 12½c. |
| Manganese, 150 mesh | 61c. |
| Nickel, 150 mesh | 51½c. |
| Solder powder, 100 mesh | 8½c. plus metal |
| Tin, 100 mesh | 58¾c. |
| Tungsten metal powder, 98%-99%, any quantity, per lb. | $2.60 |
| Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. | $2.60 |
| Under 100 lb. | $3.00 |

*Freight allowed east of Mississippi.

## COKE

| Furnace, beehive (f.o.b. oven) | Net Ton |
|---|---|
| Connellsville, Pa. | $7.00* |
| **Foundry, beehive (f.o.b. oven)** | |
| Fayette Co., W. Va. | 8.10 |
| Connellsville, Pa. | 8.25 |
| **Foundry, By-Product** | |
| Chicago, del'd | 13.35 |
| Chicago, f.o.b. | 12.60 |
| New England, del'd | 14.25 |
| Kearny, N. J., f.o.b. | 12.65 |
| Philadelphia, del'd | 12.88 |
| Buffalo, del'd | 13.00 |
| Portsmouth, Ohio, f.o.b. | 11.10 |
| Painesville, Ohio, f.o.b. | 11.75 |
| Erie, del'd | 12.75 |
| Cleveland, del'd | 12.80 |
| Cincinnati, del'd | 12.85 |
| St. Louis, del'd | 13.35 |
| Birmingham, del'd | 10.50 |

*Hand drawn ovens using trucked coal permitted to charge $7.75 per ton plus transportation charges.

## PRICES

### REFRACTORIES
*(F.o.b. Works)*

*Fire Clay Brick*

| | Per 1000 |
|---|---|
| Super-duty brick, St. Louis | $66.55 |
| First quality, Pa., Md., Ky., Mo., Ill. | 52.85 |
| First quality, New Jersey | 57.70 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 47.95 |
| Sec. quality, New Jersey | 52.55 |
| No. 1 Ohio | 44.30 |
| Ground fire clay, net ton | 7.80 |

*Silica Brick*

| | |
|---|---|
| Pennsylvania and Birmingham | $52.85 |
| Chicago District | 60.65 |
| Silica cement, net ton (Eastern) | 9.25 |

*Chrome Brick*

| | Per Net Ton |
|---|---|
| Standard chemically bonded, Balt., Plymouth Meeting, Chester | $54.00 |

*Magnesite Brick*

| | |
|---|---|
| Standard, Balt. and Chester | $76.00 |
| Chemically bonded, Baltimore | 65.00 |

*Grain Magnesite*

| | |
|---|---|
| Domestic, f.o.b. Balt. and Chester in sacks (carloads) | $43.48 |
| Domestic, f.o.b. Chewelah, Wash. (in bulk) | 22.00 |

### RAILS, TRACK SUPPLIES
*(F.o.b. Mill)*

| | |
|---|---|
| Standard rails, heavier than 60 lb., No. 1 O.H., gross ton | $43.00 |
| Angle splice bars, 100 lb. | 2.70 |

| *(F.o.b. Basing Points)* | *Per Gross Ton* |
|---|---|
| Light rails (from billets) | $43.00 |
| Light rails (from rail steel) | 39.00 |

| | *Base per Lb.* |
|---|---|
| Cut spikes | 3.00c. |
| Screw spikes | 5.15c. |
| Tie plate, steel | 2.15c. |
| Tie plates, Pacific Coast | 2.30c. |
| Track bolts | 4.75c. |
| Track bolts, heat treated, to railroads | 5.00c. |
| Track bolts, jobbers discount | 63-5 |

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

### CORROSION AND HEAT-RESISTING STEEL
*(Per lb. base price, f.o.b. Pittsburgh)*

*Chromium-Nickel Alloys*

| | No. 304 | No. 302 |
|---|---|---|
| Forging billets | 21.25c. | 20.40c. |
| Bars | 25.00c. | 24.00c. |
| Plates | 29.00c. | 27.00c. |
| Structural shapes | 25.00c. | 24.00c. |
| Sheets | 36.00c. | 34.00c. |
| Hot rolled strip | 23.50c. | 21.50c. |
| Cold rolled strip | 30.00c. | 28.00c. |
| Drawn wire | 25.00c. | 24.00c. |

*Straight-Chromium Alloys*

| | No. 410 | No. 430 | No. 442 | No. 446 |
|---|---|---|---|---|
| F.Billets | 15.725c. | 16.15c. | 19.125c. | 23.375c. |
| Bars | 18.50c. | 19.00c. | 22.50c. | 27.50c. |
| Plates | 21.50c. | 22.00c. | 25.50c. | 30.50c. |
| Sheets | 26.50c. | 29.00c. | 32.50c. | 36.50c. |
| Hot strip | 17.00c. | 17.50c. | 24.00c. | 35.00c. |
| Cold strip | 22.00c. | 22.50c. | 32.00c. | 52.00c. |

*Chromium-Nickel Clad Steel (20%)*

| | No. 304 |
|---|---|
| Plates | 18.00c.* |
| Sheets | 19.00c. |

*Includes annealing and pickling.

### ELECTRICAL SHEETS
*(Base, f.o.b. Pittsburgh)*

| | Per Lb. |
|---|---|
| Field grade | 3.20c. |
| Armature | 3.55c. |
| Electrical | 4.05c. |
| Motor | 4.95c. |
| Dynamo | 5.65c. |
| Transformer 72 | 6.15c. |
| Transformer 65 | 7.15c. |
| Transformer 58 | 7.65c. |
| Transformer 52 | 8.45c. |

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.


IF THERE IS A FLAW "FLASH-O-LENS" WILL FIND IT!

The new FLASH-O-LENS offers foundry-men, machinists, and many others engaged in producing metal parts for war contracts an efficient, economical means of examining the most minute defects during routine inspections.

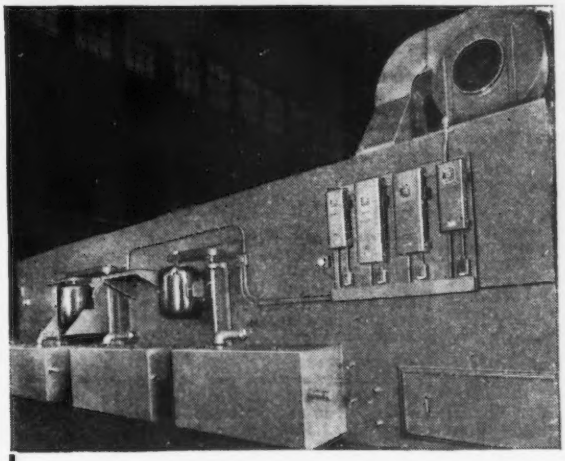
FLASH-O-LENS consists of a portable 40x microscope combined with a perfect source of illumination in one convenient, compact unit . . . They are available in several models—powered by either standard flash light dry cells or by current from any AC or DC outlet—and with a selection of various combinations of lenses, all interchangeable in the one lens housing.

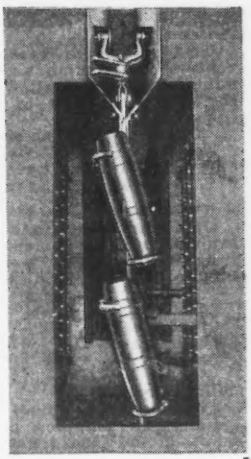
*Send today for illustrated catalog describing the new FLASH-O-LENS*

E. W. PIKE & COMPANY

PIKE

Manufacturers ELIZABETH, N. J.





RANSOHOFF PHOSPHATE COATING MACHINE

*To Get a Good Paint Job You Must Start with Thorough Cleaning*

RANSOHOFF EQUIPMENT such as the cleaning machine shown cleans and phosphate-coats shells prior to painting . . . and with the war effort stepped up again to frantic speed this is most important.

Note the position of the shells to insure thorough cleaning as they travel through the spray chambers in fixtures hung from the monorail conveyor. The continuous process eliminates manual handling and cuts cost. Machine is equipped with RANSOHOFF PACKLESS PUMPS.

*RANSOHOFF FIELD ENGINEERS will be glad to discuss your cleaning problems with you.*

N. Ransohoff, Inc.

1315 TOWNSHIP AVE. • CINCINNATI 16, OHIO

### *Ferromanganese*

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk) ..... $135.00
Carload lots (packed) ..... 141.00
Less ton lots (packed) ..... 148.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

### *Manganese Metal*

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.
Carload, bulk ..... 36c.
L.c.l. lots ..... 38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.
Carload, bulk ..... 34c.
L.c.l. lots ..... 35c.

### *Spiegeleisen*

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

| | 16-19% Mn 3% max. Si | 19-21% Mn 3% max. Si |
|---|---|---|
| Carloads ..... | $35.00 | $36.00 |
| Less ton ..... | 47.50 | 48.50 |

### *Electric Ferrosilicon*

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| 50% Si ... | 6.65c. | 7.10c. | 7.25c. |
| 75% Si ... | 8.05c. | 8.20c. | 8.75c. |
| 80-90% Si. | 8.90c. | 9.05c. | 9.55.c |
| 90-95% Si. | 11.05c. | 11.20c. | 11.65c. |

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

### *Silvery Iron*

*(C/L, Per Gross Ton, base 6.00 to 6.50 Si)*

F.o.b. Jackson, Ohio ..... $30.50
Buffalo ..... 31.75

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

### *Bessemer Ferrosilicon*

Prices are $1 a ton above silvery iron quotations of comparable analysis.

### *Silicon Metal*

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| 96% Si, 2% Fe. | 13.10c. | 13.55c. | 16.50c. |
| 97% Si, 1% Fe. | 13.45c. | 13.90c. | 16.80c. |

### *Ferrosilicon Briquets*

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Carload, bulk. | 3.35c. | 3.50c. | 3.65c. |
| 2000 lb.-carload ..... | 3.8c. | 4.2c | 4.25c. |

### *Silicomanganese*

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk ..... 6.05c.
2000 lb. to carload ..... 6.70c.
Under 2000 lb. ..... 6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb. ... 5.80c.
2000 lb. to carload ..... 6.30c.
Less ton lots ..... 6.55c.

### *Ferrochrome*

*(65-72% Cr, 2% max. Si)*

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| 0.06% C ..... | 23.00c. | 23.40c. | 24.00c. |
| 0.10% C ..... | 22.50c. | 22.90c. | 23.50c. |
| 0.15% C ..... | 23.00c. | 23.40c. | 23.00c. |
| 0.20% C ..... | 21.50c. | 21.90c. | 22.50c. |
| 0.50% C ..... | 21.00c. | 21.40c. | 22.00c. |
| 1.00% C ..... | 20.50c. | 20.90c. | 21.50c. |
| 2.00% C ..... | 19.50c. | 19.90c. | 21.00c. |
| 66-71% Cr, 4-10% C ..... | 13.00c. | 13.40c. | 14.00c. |
| 62-66% Cr, 5-7% C ..... | 13.50c. | 13.90c. | 14.50c. |

### *High-Nitrogen Ferrochrome*

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

### *Low-Carbon Ferromanganese*

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

| | Carloads, Bulk | Ton Lots | Less Ton |
|---|---|---|---|
| 0.10% max. C, 1 or 2% max. Si | 23.00c. | 23.40c. | 23.65c. |
| 0.15% max. C, 1 or 2% max. Si | 22.00c. | 22.40c. | 22.65c. |
| 0.30% max. C, 1 or 2% max. Si | 21.00c. | 21.40c. | 21.65c. |
| 0.50% max. C, 1 or 2% max. Si | 20.00c. | 20.40c. | 20.65c. |
| 0.75% max. C, 7.00% max. Si | 16.00c. | 16.40c. | 16.65c. |

### *Ferrochrome Briquets*

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Carload, bulk.. | 8.25c. | 8.55c. | 8.95c. |
| Ton lots ..... | 8.75c. | 9.25c. | 10.75c. |
| Less ton lots... | 9.00c. | 9.50c. | 11.00c. |

### *Ferromanganese Briquets*

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Carload, bulk .. | 6.05c. | 6.30c. | 6.50c. |
| Carload, bulk .. | 6.05c. | 6.30c. | 6.60c. |
| Ton lots ..... | 6.65c. | 7.55c. | 8.55c. |
| Less ton lots .. | 6.80c. | 7.80c. | 8.80c. |

### *Calcium—Manganese—Silicon*

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Carloads ..... | 15.50c. | 16.00c. | 18.05c. |
| Ton lots ..... | 16.50c. | 17.35c. | 19.10c. |
| Less ton lots.. | 17.00c. | 17.85c. | 19.60c. |

### *Calcium Metal*

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

| | Cast | Turnings | Distilled |
|---|---|---|---|
| Ton lots ..... | $2.80 | $2.30 | $5.00 |
| Less ton lots.. | 2.30 | 2.30 | 5.75 |

### *Chromium—Copper*

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot ..... 45c.

### *Ferroboron*

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Ton lots ..... | $1.20 | $1.2075 | $1.229 |
| Less ton lots .... | 1.30 | 1.3075 | 1.329 |

### *Manganese—Boron*

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| Ton lots ... | $1.89 | $1.903 | $1.935 |
| Less ton lots | 2.01 | 2.023 | 2.055 |

### *Nickel—Boron*

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

| | Eastern Zone | Central Zone | Western Zone |
|---|---|---|---|
| 11,200 lb. or more .. | $1.90 | $1.9125 | $1.9445 |
| Ton lots ... | 2.00 | 2.09125 | 2.0445 |
| Less ton lots | 2.10 | 2.1125 | 2.1445 |

### *Other Ferroalloys*

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more.... $1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth ..... $2.70
Crucible ..... $2.80
Primos ..... $2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal..... $1.80

Vanadium pentoxide, 88%-92% $V_2O_5$ technical grade, contract basis, any quantity, per lb. contained $V_2O_5$. Spot sales add 5c. per lb. contained $V_2O_5$ ..... $1.10

Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots ..... 25c.
2000 lb. to carload..... 26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots ..... 58c.
2000 lb. to carload..... 59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1 ..... 87.5c.
No. 6 ..... 60c.
No. 79 ..... 45c.

Bortram, f.o.b. Niagara Falls

Ton lots, per lb..... 45c.
Less ton lots, per lb..... 50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.

2000 lb. lots..... $2.25
Under 2000 lb. lots..... $2.30

Ferrotitanium, 40%-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti.. $1.23
Less ton lots ..... $1.28

Ferrotitanium, 20%-25%, 0.10%C. max., ton lots, per lb. contained titanium ..... $1.35
Less ton lots ..... $1.40

High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload.....$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton..... $58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton ..... $75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. 95c.

Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. ..... 80c.

Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo..... 80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo..... 80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales

Carload lots ..... 14c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy

Carload, bulk ..... 4.6c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk ..... 5.75c.
Ton lots ..... 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots ..... 8.00c.
Ton lots ..... 8.75c.
Less ton lots ..... 9.25c.